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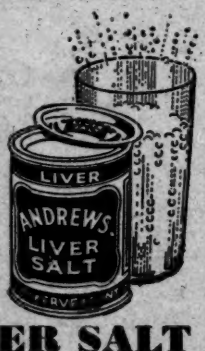

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 2 1943

A PROSPECT IN THERAPEUTICS*

BY

Sir HENRY DALE, G.B.E., M.D., P.R.S.

One of the clear impressions left by my student days in hospital, at the beginning of the present century, is that of surprise and disappointment at the lack of conviction, and even of interest, which our teachers showed in medicinal treatment, in contrast to the care and enthusiasm which they devoted to diagnosis. I suppose that before I entered the wards I had assumed, with the world at large, that a correct diagnosis would regularly enable an appropriate and effective remedy to be applied. It was disappointing to discover that this was so rarely the result, and that treatment would so often be prescribed with no better hope than to make the patient easier by alleviation of his symptoms, leaving Nature to deal, if possible, with the cause of the trouble. It is clearer to me in retrospect than it was at the time that there were very few remedies then which were even expected to deal with the causes of disease; for knowledge of those causes was itself a new thing, though it was beginning to come in a flood from the fresh outburst of experimental medicine in the last quarter of the nineteenth century. I think, indeed, that the period which I thus recall probably represented about the low-water mark of interest and confidence in the remedial value of drugs. Some of the established remedies for symptoms were clearly invaluable for their own purposes—digitalis, for example, morphine, cocaine, the bromides, and the general anaesthetics. The same was true of the use of salicylates in acute rheumatism, though it was not clear whether this dealt with the symptoms only or with the cause of the disease; nor can it be so even now until the cause of acute rheumatism is established beyond doubt. There were, indeed, a few drugs even then in use of which we can say, in the light of present knowledge, that their remedial value was due to action on the infective causes of the diseases in which they were used—cinchona and quinine for malaria, ipecacuanha (though not yet emetine) for dysentery, mercury and the iodides for syphilis. But at that time the knowledge of the malaria parasites was almost a novelty, the dysenteries were imperfectly differentiated, and the discovery of the spirochaete of syphilis was still in the future. The use of these remedies, like that of so many others, was then still based on the tradition of past centuries.

Emergence of Remedies of New Types

Out of the experimental researches which were bringing to light the causes of disease, and thus weakening the credit of drugs which could do no more than modify or alleviate symptoms, there were emerging, on the other hand, remedies of new types—not drugs unnatural to the body, but natural principles which would directly repair its deficiencies, or would supplement and reinforce its protective responses to infections. One brilliant example was already available of each of these two types of natural medication. These were the treatment of myxoedema and cretinism with thyroid gland substance, and the treatment of diphtheria with the specific antitoxin. Here, beyond doubt, were remedies dealing directly with causes; and it was very clear that the physician ordered these with a confidence in their efficacy that contrasted strongly with the vague hope of indirectly helping the curative action of Nature, on which so much of the older therapeutics seemed to depend. It was in this direction only, in the provision of such natural remedies for deficiencies and infections, that a prospect seemed then to be opening for a new therapeutics dealing with causes; and researches in a range of the sciences allied to medicine have indeed gone far beyond any prospect then visible, in providing the wealth of hormones, vitamins, and immunological remedies which are now available. These alone would have effected a therapeutic revolution; we have only to recall the treatment of diabetes without insulin, of pernicious anaemia without liver extract, of rickets without vitamin D, or, for those whose memories extend so far, of diphtheria without antitoxin, to recognize its magnitude. At the beginning of the century it might well have seemed, on the other hand, that the prospect of advance open to the older therapeutics, which used drugs and chemicals unnatural to the body, and to a pharmacology then concentrated on attempts to analyse the effects of these, would be limited to the discovery of new and perhaps better remedies for the alleviation of symptoms. This, indeed, has been achieved, and with an almost embarrassing profusion. But the prospect was not to be thus limited. Even before this century began, the idea of a new type of therapeutic enterprise, aiming by deliberate experiment at the discovery of new artificial remedies which would deal directly with the causes of infection, had already begun to germinate. The results of this undertaking, as we can see them to-day, figure at least as prominently as the discovery of the natural remedies in the tremendous change, since the beginning of the century, in the very objective as well as in the achievements of medicinal treatment. I invite you to consider with me, in brief review, the steps leading to the present position, and the prospect now visible of a more regular and ordered advance in this quest for new and specific remedies for infections, called "Chemotherapy" by Paul Ehrlich, the man of genius who first undertook it and led the way to its first achievements.

As long ago as 1891, just when antitoxins were being newly discovered, Ehrlich had already seen that some of the parasitic causes of infection then coming to knowledge in such an imposing sequence did not evoke any rapid or effective reaction of immunity. He himself was also then engaged in experiments on antitoxins and antigens, and for another decade he was to lead the world in researches which gave to these their practical applications; but he had seen that along those lines there was nothing in view for the treatment of malaria, for example. The use of quinine had provided one of the few historic examples of a remedy which was dealing with the parasitic cause of an infection long before this was known. But, as Ehrlich was apt to complain, although the parasites causing malaria were now well recognized, pharmacology could still offer only data about the action of quinine on frog's

* The Frederick Price Lecture delivered to the Royal College of Physicians, Edinburgh, on July 2, 1943.

muscle or on the mammalian nervous system, and nothing really relevant to its practical value in banishing the malaria parasites from the patient's blood. He embarked on a direct attempt to find a remedy for malarial infections better than quinine. He had been one of the first to use the aniline dyes in medical research, and had made extensive studies of the selective staining action of methylene blue. Since this dye stained the malarial parasites, and was not very poisonous for the higher animals, he was led to try it as a substitute for quinine. He obtained no more than a hint of success; methylene blue was certainly not better than quinine; but in that early observation was the germ of the method of research which he was later to call Chemotherapy. It is of interest, further, to note that when at length, many years after Ehrlich's death, the experimental use of malaria-like infections of birds led to the discovery of artificial remedies for human malaria itself, the structural analogy of methylene blue rather than that of quinine provided the point of departure for trials which led to success.

Dyes and Analogous Substances

When his studies on toxins and antitoxins were drawing to a close Ehrlich returned to this search for artificial remedies which would thus act directly on the causes of infection. The researches of Laveran and Mesnil had by this time brought to notice much more suitable conditions for such experimental work, in the use of trypanosomes which, unlike the parasites of human malaria, could be transmitted and retransmitted in indefinite series to small animals, such as rats and mice. Here were large actively motile protozoa, readily visible in a drop of blood under a moderate power of the microscope. It was easy to watch the effect on them of substances to be tested for curative action, to see whether the trypanosomes were stained by these if they were dyes, whether, in any case, their motility was abolished or impaired, and whether a treatment caused them to disappear from the peripheral blood of an infected animal. Early in these studies Ehrlich and the Japanese bacteriologist Shiga, who was then working with him, found a benzidine dye, which they called trypan red, that would

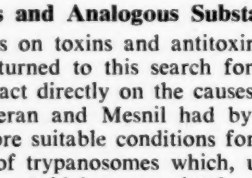

Fig. 1.—Trypan red.

stain the trypanosomes with which they were working, and would banish these from the blood of mice heavily infected with them and bring to an end an infection which, if untreated, was progressive and uniformly fatal. This, the first experimental success of the new method of approach to therapeutics, has a personal interest for me in that it was just coming to completion when I myself was privileged to enter Ehrlich's Institute in Frankfort for a short period, in 1903. I do not think that anybody, except perhaps Ehrlich himself, foresaw at that time what the future might hold of development from this small beginning.

Trypan red had not itself a real success in practical therapeutics; neither in man nor in large domestic animals would it deal with natural trypanosome infections as it had dealt with the very acute artificial infections of mice and rats. It did provide, however, the starting-point for a series which reached the peak of its achievement, so far, in the production, many years after Ehrlich's death but under the inspiration of his former pupil Hermann Roehl, of the complex substance known first as "Bayer 205," and later as "germanin," "antrypol," and "suramin," the last being the unprotected name adopted for general use by the *British Pharmacopoeia*.

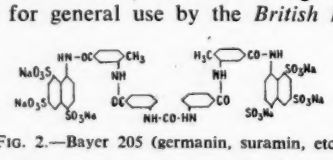

Fig. 2.—Bayer 205 (germanin, suramin, etc.).

This is a colourless substance, but in structure and substantive properties resembles the dyes, and is a remedy of real value. After trypan red, French workers had produced other dyes with remedial actions on infections with trypanosomes—trypan blue and afridol violet; and the latter, though not a practical success in itself, contained already the central urea-linkage which characterized the structure of the later Bayer 205 (suramin).

The line of research which started with the benzidine dye, trypan red, had thus led to one clear practical success; but it had made a contribution of much wider importance to the future of this newer kind of therapeutics in the knowledge which it had afforded incidentally concerning the mode of action of some of these artificial remedies for infection. Ehrlich had, as was usual with him, picturesque conceptions of the mode of action of these curative substances. He thought of them as magic bullets, flying unerringly to the objective and avoiding anything else in their path. Their specific affinity must at least be strong, he maintained, for the infecting parasite, and weak or wanting for the cells of the infected subject—they must be maximally parasitotropic and minimally organotropic; and he attributed this selective affinity to the possession by the protoplasm of the parasite, and the absence from or paucity in the body cells, of "chemoreceptor" groups with which the curative substance would specifically combine. The action of an effective chemotherapeutic remedy, when thus fixed, he had thought of as a direct and rapid killing of the parasites, in a dose still harmless to the cells of the host. It has become, in fact, very doubtful whether the action of any successful chemotherapeutic agent conforms to this simple type. When Ehrlich and his co-workers watched the action, on trypanosomes swimming in diluted blood, of a dye which rapidly cured mice of an infection by the same species of trypanosomes, the effect observed was not of this directly lethal type. The organisms were seen to be stained by the dye, but their motility was unaffected, and the period of their survival under the artificial conditions was not perceptibly reduced. Yet when these stained and apparently still vigorous trypanosomes were injected into a normally susceptible mouse no infection followed. Ehrlich interpreted this observation as showing that the dye, while leaving the contractile activity of the trypanosomes unimpaired, had stopped their power of multiplication, so that when they were injected into the mouse they died without reproducing themselves, and no infection was established. At the time when it was first put forward this might well have been regarded as an explanation of the opportunist type, improvised to meet an observed anomaly. With trypanosomes it could not be put to the test of more critical experiment, since there is no method even yet available for inducing these parasites to multiply in artificial culture. Nevertheless subsequent evidence obtained with organisms of other types has abundantly confirmed this speculative idea. There can now be no doubt, I think, that a large proportion of chemotherapeutic cures are, in fact, produced in this way—that the infection is brought to an end by stopping the further multiplication of the parasites, rather than by killing them outright; and it will be convenient to mention at this point one of the observations in which this mode of action was directly demonstrated.

During the last war it was found by Dobell and myself that the visible action of emetine on the vitality of *Entamoeba histolytica*, during the limited period of its survival in a saline suspension after removal from the infected bowel, was remarkably weak. To immobilize and visibly to kill the amoebae under these conditions a concentration of emetine was required many times greater than any which the human body would tolerate. By contrast, a derivative of emetine—demethoxyemetine—which was much more toxic for the amoebae in such tests and much less toxic for man, was found by Dr. Carmichael Lowe to be devoid of curative action in cases of amoebic dysentery which yielded normally to emetine. It was clear that observation on surviving amoebae, made under such conditions, gave no measure at all of the therapeutic action of the substances tested. One of the possibilities which we considered was that the curative action of emetine might be due, not to such outright killing of the amoebae, but to suppression only of their growth and reproduction. It must be admitted that this had not seemed to us then to be very likely; but when Dobell and Laidlaw later devised a really good method for maintaining *Entamoeba histolytica* in artificial cultures it became possible for them to test a number of substances directly for their power to stop the multiplication of the amoebae. It was then revealed that emetine and its lower homologue, cephaeline, had a pre-eminent activity of

this kind, corresponding to their unique value, among alkaloids of that series, in curing amoebic dysentery; while, by contrast, the derivatives, like demethoxyemetine, which had appeared to have a more potent immediate action on the vitality of individual amoebae but had failed to cure the infection in man, failed altogether to stop the growth of cultures when applied in the high dilutions at which emetine was still effective.

Arsenical Compounds

Another important line of chemotherapeutic research had started in 1905 with the observation by Thomas and Breinl, in Liverpool, that an organic derivative of arsenic acid, which had been marketed under the trade name "atoxyl," had a significant curative action on trypanosome infections in small rodents. Ehrlich then discovered, with Bertheim, in 1907, the true structure of atoxyl, as *p*-aminophenyl-arsonic acid:

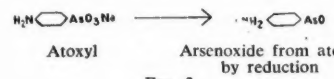

FIG. 3.

With Roehl he added, in 1909, the very important observation that atoxyl itself had little visible effect on trypanosomes outside the body, but that the arsenoxide produced from it by reduction, in which the pentavalent arsenic was reduced to the trivalent arsenious form, was rapidly lethal for them in high dilutions. Following these clues, and widening the biological scope of the quest to include pathogenic spirochaetes as well as trypanosomes, he ultimately arrived with his Japanese co-worker, Hata, at the earliest major triumph of what was then (1910) still the new research method of chemotherapy, in the discovery of salvarsan (arsphenamine), with its revolutionary effect on the treatment of syphilis and other spirochaetal infections.

My concern, however, is not with the now familiar record of this practical therapeutic achievement but rather with what could be learned from the actions of atoxyl, salvarsan, and related substances, such as the later tryparsamide, as to the nature of the chemotherapeutic process. Salvarsan, an arsenobenzene derivative, has its arsenic in the trivalent form, but in a stage of reduction beyond that of the arsenoxide. Ehrlich's co-workers tested its directly lethal action on spirochaetes, using the soluble derivative neosalvarsan, which can be applied in a solution of neutral reaction, and found that here again the motility and visible signs of vitality of the organisms were unimpaired, though again they failed to produce infection if they were injected into a susceptible animal after they had been so treated. We might suppose, as Ehrlich had suggested in the case of trypanosomes treated with dyes, that the action of salvarsan had been to deprive the spirochaetes of the power of reproducing themselves, without directly and immediately destroying all their vital properties.

We have seen, however, that reduction of the pentavalent arsenical group of atoxyl to the trivalent condition, producing the corresponding arsenoxide, made it immediately and intensely lethal for trypanosomes; and the same is true of the most important of these pentavalent arsenicals, the later-introduced tryparsamide. Now if the arseno-compound salvarsan is partially oxidized, so as to produce two molecules of the corresponding arsenoxide, the same appearance of an immediate

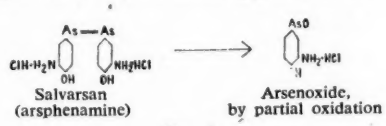

FIG. 4.

intense toxicity for trypanosomes or spirochaetes is observed. For salvarsan (arsphenamine), therefore, as for the pentavalent arsenicals, there was a likelihood that the curative action observed after injection into a man or an animal suffering from a trypanosomal or spirochaetal infection was due, not to the substance as injected, but to a much more active arsenoxide produced from it by a relatively slow process of partial oxidation or reduction, as the case might be. And this possibility was directly supported by experiments carried out by Voegtlin and his co-workers, demonstrating that the relatively slow effects of either the arsenic acids or the arseno-derivatives, in causing the disappearance of the parasites from the blood, began after a definite interval, which was not present before the onset of the much more rapid action which the corresponding arsenoxides produced in much smaller doses. So that we have available two quite different explanations of the apparent lack of activity, outside the body, of arsenical derivatives which are so effective against the same parasites *in vivo*: on the one hand, the therapeutic process may, as in other cases, be due to the suppression of the reproduction of the parasites, rather than to the immediate destruction of all their vital activities; and, on the other hand, these arsenicals probably act after conversion, by contact with the body tissues, into the directly active form, by partial reduction or partial oxidation, as the case may be.

These considerations may naturally raise the question why, if the action is in any case due to the arsenoxides, these should not be directly administered, rather than the substances from which the body will produce them slowly and after an initial delay. Ehrlich, be it noted, had the arsenoxide corresponding to salvarsan in his hands before he had salvarsan itself, which he produced from it by reduction. Why did he introduce this additional step in production of the remedy, and impose on the body, apparently, the task of reversing it? The answer, I think, is to be found in the fact that the arsenoxide is not only much more potent in its action on the parasites but also, and to an equal extent, more poisonous for the tissues of the mammalian or other infected host. It can therefore only be given in a small dose at one injection; and, though the effect of this against the parasites is immediate and powerful, the concentration of the arsenoxide in the body fluids falls so rapidly from this low, tolerable concentration to a level below that at which it is effective, that the action is as evanescent as it is powerful. Even if only a few parasites have survived this brief action, these can rapidly renew their multiplication and re-establish the infection when the impediment has been removed. And there comes thus to our notice another factor in an effective chemotherapeutic action, which has not always, I suspect, received sufficient attention—namely, the need for a sufficiently prolonged and continuous action. This need is almost implied in the conception of the process as essentially an arrest of the multiplication of the parasites rather than an immediately lethal action on them. What is required is not the sudden attainment of a concentration sufficient to kill most of the parasites, at the risk of a concomitant injury to the host's tissues, but the long-continued maintenance of a much lower and safer concentration, just sufficient to suppress the propagation of the parasites, without harming the cells of the host.

It would seem reasonable, then, to attribute the special efficacy of salvarsan not to a special affinity for the parasites associated with the arsenobenzene structure but rather to the physical properties which enable it to form a depot in the tissues, or, perhaps, a film on the surface of the parasites, from which a steady low concentration of the much more toxic but directly active arsenoxide will be produced. Discussing this idea in a review, now some twenty years ago, I further raised the question whether the same result might be obtained by direct injection of the arsenoxide, if means could be devised for administering this by a slow, continuous infusion. Apparently this has now been achieved, and the hydrochloride of this precursor of salvarsan, which Ehrlich so long ago rejected as too immediately toxic, has, in fact, recently come into use in the U.S.A., and even more recently in this country, for intravenous administration by constant drip infusion, or by frequently repeated small injections, under the trade name "mapharsen," or "mapharside."

How the Action of Diamidines was Discovered

Hitherto the process of discovery of new therapeutic agents had been to a large extent empirical, involving the synthetic preparation and testing of a large variety of derivatives of some substance which had itself shown a promising degree of activity against some particular kind of infection. Such new starting-points have themselves, in notable instances, been reached with the help of theories which have had to be discarded. A striking example is provided by researches started

by Prof. v. Jancsó of Szeged, who set out to find substances which would deal with trypanosomes, not by killing them, or even affecting them directly, but by starving them out. So he treated the infected mice with decamethylene-diguanidine, which, under the name "synthalin," had been tried some years ago as a synthetic substitute for insulin. It had not been really successful for that purpose, but v. Jancsó found that it caused the trypanosomes to disappear rapidly from the blood of his mice, and naturally regarded this as confirming his conception of a chemotherapy based on depriving the trypanosomes of glucose by causing a disappearance of that substance from the

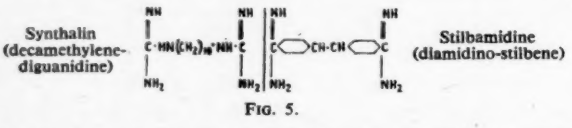

FIG. 5.

blood. Fortunately the late Prof. Warrington Yorke had the curiosity to test the matter for himself, and found that synthalin, applied even in extremely high dilutions, containing as little as 1 part in some 250 millions, would cause the death of trypanosomes in an artificial suspension in which there could be no question of its affecting the supply of glucose. And thus synthalin, the trypanocidal action of which had been discovered in a trial based on a completely erroneous hypothesis, became the starting-point of a new line of investigation, in which my former colleague Dr. Harold King and the late Prof. Warrington Yorke were led to the discovery of still more therapeutically potent and at the same time less toxic diamidines; and their discoveries led, in turn, to further developments in industrial laboratories which have given to therapeutics the substances called stilbamidine, which seems likely to establish itself as the most effective remedy for kala-azar yet produced, curing types of that infection in which antimonial remedies of all kinds had failed; pentamidine, which has proved to be effective in Babesia infections of cattle; and propamidine, which appears to be giving promising results even in the local treatment of certain bacterial infections of wounds. It is of interest to note that, as long ago as 1928, Staub and Küng had observed the powerful antiseptic action of synthalin, but regarded it as too toxic to have chemotherapeutic value.

Sulphanilamide and its Derivatives

The fact that v. Jancsó's conception, which led him to test the chemotherapeutic action of synthalin, had so little true relation to what he observed or to the discoveries which followed from the clue thus presented, should not prevent us from recognizing its essential novelty. He seems to have envisaged, for the first time, the possibility of a chemotherapy which eliminates the parasites, not by a direct action on them of any kind, but by depriving them of nutriment—not by a *Blitzkrieg*, or even by a war of attrition, but by a food-blockade. We shall see that this idea is not wholly unrelated to those which offer the most suggestive interpretation for one of the most recently discovered and probably the most widely recognized and celebrated of all chemotherapeutic actions—the action on bacterial infections of sulphanilamide and the growing family of its derivatives. The effect of introducing a sulphonamide ($-SO_2NH_2$) grouping into azo-dyes, in increasing the fastness of their staining properties for silk and wool, their so-called "substantive" properties, probably led to the first trial of such compounds for therapeutic effects on infections due to bacteria, on the lines of Ehrlich's conception that the remedy must be fixed by the parasite to exert its lethal, curative action. For many years there had been no clear and unqualified success in this field of antibacterial chemotherapy, and the view had even become prevalent that chemotherapy was unlikely to provide a successful remedy for diseases due to bacteria, and that we should have to depend on immunology to produce specific remedies for these, in contrast to the success of chemotherapy, and the failure of immunology, in finding remedies for infections due to protozoa and spirochaetes. Even in this period of long delay, however, there were more promising signs for those who could read them. Morgenroth's discovery of the cure of experimental pneumococcus infections in mice by optochin, an artificial homologue of quinine, had failed of practical application only because of an unforeseen toxic action of this alkaloid on a proportion of human patients. Browning, during the last war, had discovered valuable antibacterial properties in acriflavine, an acridine dye which Ehrlich had earlier found to be effective in trypanosome infections of mice and had named trypaflavin in that connexion; but acriflavine and the simpler proflavine, while retaining their value as bactericidal agents for local applications, had not proved suitable for internal chemotherapy in the stricter sense. It appears, indeed, in retrospect, that the curative value of sulphanilamide itself might even have been discovered many years earlier, when Heidelberger and Jacobs, in New York, observed in 1919 that a sulphonamide derivative of the cinchona alkaloid cupreine had a potent antiseptic action on artificial cultures of certain bacteria. There was no practical development, however, of that observation; and the production of the red sulphonamide dye known as prontosil, a sulphonamide of the dye chrysoidine, by the German chemists Klarer and Mietsch in 1932, and Domagk's finding that this had a definite curative action on mice infected by an otherwise fatal injection of streptococci, was an essentially new discovery, and certainly one of the most important yet made in the short history of chemotherapy. Domagk published these observations in 1935, with the promising results of certain clinical trials of prontosil on cases of streptococcal infection in man. In the following year

FIG. 6.

Colebrook and Kenny, in London, completed an extended and carefully controlled clinical trial of its value, in a uniform series of cases; and the publication of their results first convinced the world that the discovery of prontosil and its action was an event of first-rate importance for practical therapeutics. Even while this trial was in progress, however, came evidence from Tréfouel, Nitti, and Bovet, in Paris, that sulphanilamide, a reduction cleavage-product of prontosil, was as effective against experimental infections as prontosil itself; and Colebrook and Kenny were thus able to confirm this finding also, and to extend it to the natural streptococcal infections of their series. And then it was found that prontosil undergoes this reduction cleavage in the body, giving rise there to sulphanilamide; it might be doubted, therefore, whether there was any ground for connecting the action of prontosil with its properties as a dye, or for regarding it as anything but a source of sulphanilamide.

When prontosil was tested on artificial cultures of streptococci, or of other organisms susceptible to its action *in vivo*, it had no effect upon them. Sulphanilamide, on the other hand, while it did not sterilize the culture in any reasonable concentration, stopped its growth in dilutions comparable to those which could be produced in the blood of the living patient. Here again, therefore, we have a case in which the substance originally administered was not chemotherapeutically active as such, and in which the direct agent, formed from it by action of the body tissues, produced its effect by stopping the growth of the infecting parasites and not by killing them directly—being in this instance "bacteriostatic" and not directly "disinfectant" in its action. There was not in this case, however, any clear advantage in administering the inactive precursor prontosil and allowing the directly active substance sulphanilamide to be formed from it as required; the cleavage proceeded so rapidly that the administration of the preformed sulphanilamide appeared to be practically equivalent.

From that point onwards the practical applications of sulphanilamide itself, and of the succession of more effective derivatives that have issued from the chemical laboratories of many countries, have been developed and extended with a rapidity new to experience. Week by week the medical press of the world has offered, and still offers, new evidence of the special value of one or another of these derivatives for the treatment of a particular type of infection; and the repute of their value has spread far beyond medical circles. There can be no doubt that their introduction has, in itself, transformed an important branch of curative medicine, or that the use of these substances by various methods, including that of

local application, has changed the aspect of many of the medical and surgical problems of war. The prospect, however, of an ordered development of this relatively new field must certainly depend on the extent to which a clearer conception can be attained of the nature of the chemotherapeutic process itself; and a new promise of such insight was offered by discoveries which were just becoming ripe for record, when the outbreak of war again brought an interruption of so many researches of the type requiring patient concentration and the long view.

New Links between Chemotherapy and Biochemistry

The conceptions which spring from these recent discoveries, in contrast to those which were earlier dominant, attempt to interpret the action of a drug on an infecting organism in terms of a cellular biochemistry which was not available to the earlier theorists. As long ago as 1923 Voegtlin and his co-workers, in considering the mode of action of the directly active arsenoxides produced in the body from arsphenamine and the other specifically curative arsenic derivatives, had pictured the arsenoxide radical as combining with the thiol radicals of glutathione in the protoplasm of the cells affected, and thereby interfering with their respiratory metabolism. In 1940 Fildes independently put forward a closely similar idea

FIG. 7.—Suggested mode of action of an arsenoxide (Voegtlin).

to explain the disinfectant action of mercury salts, suggesting that the mercuric ions combined with and inactivated the free thiol groups of bacterial cells. In both these investigations the suggestion was supported by evidence that reduced glutathione, or other substances offering free thiol radicals, injected into the animal or added to the culture medium, would neutralize the activities of arsenoxides and mercury salts respectively.

It will be noted that in both these cases the suggested action involved the fixation of the toxic agent to particular groups in the protoplasm of the affected cells; and to that extent the suggested thiol groups might be regarded as representing a type of Ehrlich's chemoreceptors in a chemically more definite form. Fildes, however, used his observation, and others which were being made in his laboratory, as the basis of a more general conception of the chemotherapeutic process, as essentially an interference with the action of some group or chemical factor required by the infecting organism for its normal life and growth. In such a generalized form this conception can be made applicable to the action of the sulphonamide derivatives on bacteria. There is no evidence, in this case, for any firm combination of the therapeutic agent with any group or constituent of the cells attacked. The chemoreceptor conception, in that original sense, is here not applicable. A sufficient concentration of the sulphonamide derivative must be maintained in the environment of the susceptible bacterial cells if their growth and multiplication are to be suppressed; and they begin to grow and multiply again as soon as the concentration falls below that minimum. We have then, apparently, not a combination but a labile antagonism to some substance or process needed for growth. Fildes referred to the substance, thus somehow put out of action, as an "essential metabolite," while others have spoken of a "growth factor" or pictured interference with an enzyme action. Further experiments gave a much greater precision to the idea. Stamp showed that a sterile extract of streptococci, added to the culture medium, would neutralize and nullify the bacteriostatic effect of sulphanilamide on the culture. Then Woods, in Fildes's laboratory, found that an extract of yeast would act similarly as an antagonist to the action of sulphanilamide; and, finally, he was able to identify the antagonistic constituent, to a high degree of probability, as *p*-aminobenzoic acid.

p-aminobenzoic acid Sulphanilamide

FIG. 8.

A casual inspection shows that the molecular configuration of *p*-aminobenzoic acid has a large measure of community with that of sulphanilamide. Woods accordingly suggests that the mode of action of sulphanilamide is to preoccupy some cellular enzyme, the normal function of which involves an action upon *p*-aminobenzoic acid as one of the essential steps in the growth-metabolism of the bacteria.

The hypothesis is attractively suggestive, and there is additional evidence in its favour. Woods found a fairly constant proportion between the concentration of sulphanilamide in a medium and the concentration of *p*-aminobenzoic acid which must be added to neutralize its bacteriostatic effect. He found, further, that the concentration of *p*-aminobenzoic acid required to abolish the effects of different sulphonamide derivatives increased with the bacteriostatic activity: sulphapyridine, for example, required a greater concentration to neutralize its effect, corresponding to its greater activity, than did sulphanilamide itself. It must be admitted, however, that an inspection of their formulae does not yet afford any suggestion why sulphapyridine should be more effective than sulphanilamide in preoccupying an enzyme normally acting on *p*-aminobenzoic acid. Two other substances have already been detected in certain bacteria which similarly antagonize the action of sulphanilamide, and other attempts to find substances with bacteriostatic effects, attributable to similarities in molecular configuration with other known factors of bacterial growth, such as pantothenic acid, have already given results of promise. Whether these ingenious suggestions are confirmed by further knowledge or prove to be inadequate, I believe that they will have a permanent significance, as having brought the interpretation of a chemotherapeutic process for the first time into clear relation with a cellular metabolism which can be stated in terms of a known chemistry. I think that we are entitled to hope that chemotherapy may soon find that its means of discovery are no longer limited to the almost unselective trial of as many derivatives or analogues as possible of some substance which has shown an unexplained curative effect on a particular infection. A more fundamental knowledge of the conditions and factors required for the multiplication of the infecting organisms may give, at least, an invaluable direction and concentration of aim to the search for remedies. The bacteria, with the ready opportunities they afford for studying in artificial cultures the methods of supplying and interfering with their requirements for growth, or the factors promoting their pathogenicity, offer the most promising field as yet for thus exploiting the resources of biochemistry with a therapeutic aim. But it is tempting to speculate as to what the world might gain, for example, in the present emergency if means were available for growing the malaria parasites at the different stages of their complicated life cycles, under artificial conditions permitting factors requisite for their multiplication to be studied, as a guide to attempts to find other and better remedies than quinine—even better than mepacrine (atebrin), which has already come from one of the most brilliant and determined exploitations of the longer available methods.

Mycogenous Remedies for Infections

Meanwhile, we may note the creation and strengthening of another kind of link between biochemical studies and antibacterial therapeutics. Dubos, in New York, has trained a soil bacillus, by cultural restriction, to give a good yield of peculiar polypeptides having a high toxicity for certain pathogenic bacteria, one of them, gramicidin, being specific in its intense antiseptic action for the Gram-positive cocci. Much more brilliant, however, in its promise for the practical treatment of septicaemic conditions has been the recent progress in the purification and isolation of penicillin. After Fleming's chance observation of the production of this remarkable substance from a colony of *Penicillium notatum*, and his preliminary examination of its properties, and even of its therapeutic possibilities, in 1929, there was a long gap of years. Then, after the discovery of the action of sulphanilamide had shown the possibility of an antibacterial chemotherapy with agents of a low toxicity, the interest in penicillin was revived and rapidly extended by the work of Florey and his colleagues at Oxford. They showed how it could be extracted from a culture filtrate and purified so as to make it safe for intravenous administration; and they produced the first clinical evidence of its remarkable therapeutic possibilities. And now the chemists in Oxford and elsewhere are hot on the trail,

and manufacturing laboratories on both sides of the Atlantic are straining their resources in the attempt to make and to isolate penicillin, and to determine, perhaps, its constitution, or that of the penicillins if there should prove to be more than one active constituent. Then finally, perhaps, may come a synthesis of a penicillin, or of some simpler analogue with similar action. There seems to be a possibility, even a likelihood, that this remedy against infection from a new kind of source may approach, more nearly than any other yet available, to the ideal of toxicity for the infecting organism and complete absence of it for the patient. Here again, however, the effect on the organisms is merely to prevent their multiplication, and not to kill them outright. There can be little doubt that the first pages only are being turned, as yet, of a new and brilliant chapter in the specific treatment of infections.

Conclusion

If we are to form an idea of the prospect which I took as the subject of my lecture, I think that it is important to recognize how much of the change which I have been discussing has taken place in the latter part of the period covered by the survey—in the years, in fact, since the last war came to an end. This is not only true of the progress of chemotherapy, which I have considered in more detail, but equally so of exact knowledge of the natural remedies for deficiencies. At the end of the last war only one hormone, adrenaline, had yet been chemically identified, and no vitamins. It was still possible then to suggest of many of the hormones that their very existence was problematic, and that they, and the vitamins as well, might in any case be so labile and otherwise inaccessible that the methods of chemical isolation and structural study would never be applied to them. Yet before the present war broke out large and rapidly growing series of both hormones and vitamins had been isolated, identified, and made available for practical use by artificial synthesis; and a beginning had even been made of the discovery of simpler synthetic substitutes. In chemotherapy, though salvarsan had appeared before the last war began, there was still, when it ended, no clear prospect of further advance by routes which could be mapped on scientific principles. Wholesale and almost haphazard trial of derivatives or analogues of any substance which had shown a promise of activity seemed to be the only way open; the marvel was, and still is, that so much has been achieved by such methods.

I have tried to trace the progress since that time, from the picturesque but frankly empirical conceptions which Ehrlich had bequeathed, based apparently on his knowledge of selective staining with dyes and of the extreme specificity of immune reactions. From these ideas of magic bullets, bringing down only the parasites by virtue of a mysterious affinity for them alone, we passed to recognition of the effect as stopping their reproduction rather than slaying them outright, turning to their defeat the tide of battle with the host's natural resistance to infection. We came thus to the conception of the effect as usually a mild and persistent one, dependent for that persistence, in some cases, on affinity of the remedy for the host's tissues and not merely for the parasites. And, finally, we reached a conception, just emerging, of the nature of the effect on the reproduction of the parasites, stated in biochemical terms of an interference with known factors of their growth. Look back with me again to medicinal treatment at the opening of this century, and consider that the portentous change between then and now has been so largely an achievement of the years of uneasy armistice between two open wars, at a time when the full impact of research on practical medicine was only just beginning to be felt. Portentous, I said; but what does it portend? Does it not mean that, when we have won freedom from war and from fear of war, the prospect of further achievement in this field of experimental therapeutics, so newly opened to enterprise, is brilliant beyond anything that experience yet enables us to picture? What an opportunity, I am moved to exclaim, for those who still have the years before them in which to use it! I hope that it may fall to the lot of one of them, when the passage of years may justify another review, to tell again in one of these lectures how much of this present prospect has by then become a reality, and to survey yet further possibilities, beyond any that we can now imagine, which will then be coming into view.

CUTANEOUS AND CONJUNCTIVAL DIPHTHERIA

A SERIES OF CASES

BY

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Medical literature records that cutaneous diphtheria was not an uncommon condition in the nineteenth century, but nowadays it is so rarely recognized in this country that a series of cutaneous and conjunctival infections admitted to the Isolation Hospital, Southampton, seems worth recording. All the cases were admitted from a military hospital. Rolleston (1925), describing a large number of diphtheria admissions, found that approximately 1% showed cutaneous involvement, and Cameron and Muir (1942) reported a series of 66 cases occurring among troops in Palestine.

Details of Cases

During the eight months prior to April, 1943, there were admitted to the Isolation Hospital, Southampton, from a military hospital, 19 patients who had lesions of the skin or eyes from which *C. diphtheriae* had been isolated. Of these, 12 were infected with virulent and 4 with avirulent organisms; in the remaining 3 cases tests for virulence were not carried out.

The 12 infections with virulent organisms comprised: (i) 6 cases of cutaneous diphtheria; (ii) 2 cases of cutaneous and conjunctival diphtheria; (iii) 3 cases of conjunctival diphtheria with associated skin lesions from which *C. diphtheriae* was not isolated (one of these was also a faucial carrier); (iv) 1 case of cutaneous and faucial diphtheria. The avirulent infections were 3 cases of cutaneous infection and 1 of conjunctival infection. The 3 cases in which tests for virulence were not carried out were two of cutaneous and faucial infection, and one of conjunctival infection with an associated skin lesion from which diphtheria bacilli were not isolated. All 19 patients were males aged between 21 and 37 years.

Case 1.—Admitted to the military hospital for treatment of seborrhoea of the scalp and forehead and acute purulent conjunctivitis of four days' duration. An eye swab contained diphtheroid organisms. After two weeks the conjunctivitis became more purulent, and a few days later bilateral keratitis was present. The eye was again swabbed, and was found to be infected with *C. diphtheriae* (gravis type I). When admitted to the isolation hospital bilateral conjunctivitis and keratitis were present. There were a dense opacity of the right cornea and an ulcer of the left cornea with hypopyon. No membrane was seen. Treatment consisted of 20,000 units of diphtheria antitoxin i.m., and bland irrigations to the eyes. The inflammation settled down in two weeks, leaving corneae with a frosted-glass appearance. Two months later the vision of the right eye was 6/18 and the cornea was moderately scarred, especially in the lower segment. The pupil was active, but posterior synechiae were present. The left cornea was extensively scarred and staphylomatous in the lower quarter. Vision of left eye was C.F. at 6 in. only.

Case 2.—Admitted to military hospital with impetigo of face and ear. Skin swab reported positive five weeks after admission, but later reported avirulent.

Case 3.—Admitted to the military hospital with dermatitis affecting the " respirator " area. Two weeks later developed a sore throat, a swab from which proved to contain *C. diphtheriae*. A skin swab was also positive. On admission to the isolation hospital the dermatitis cleared up within a fortnight. 10,000 units of antitoxin were given, but later skin swabs showed the presence of diphtheroids only.

Case 4.—Admitted to the military hospital with purpura and pyodermia. A skin swab was reported positive for *C. diphtheriae* shortly before transfer to the isolation hospital, where on admission the patient was found to have an ulcer the size of a five-shilling piece on the outer aspect of the right thigh. The ulcer had a well-marked edge and a grey membranous slough covering its base. 10,000 units of antitoxin were injected, and sulphanilamide powder was applied after the ulcer had been soaked to remove slough. The ulcer healed in about two months.

Case 5.—Admitted to military hospital with impetigo of the face. Three weeks later a skin swab was found to contain virulent *C. diphtheriae* (gravis).

Case 6.—Admitted to military hospital with impetigo of the face and neck of four days' duration. Five days later he developed

conjunctivitis, and the discharge contained *C. diphtheriae*. The virulence of the organism was not determined.

Case 7.—Admitted to the military hospital suffering from impetigo of the chin of fourteen days' duration. Ten days later he developed bilateral purulent conjunctivitis. White membrane was seen on the edge and inside of the lower eyelids two days later. Swabs from eyes and skin showed the presence of *C. diphtheriae* (gravis). The patient was afebrile. At the isolation hospital 60,000 units of antitoxin were given and local treatment was applied to the eyes. Skin and eyes cleared up completely in about four weeks.

Case 8.—This man had impetigo of the face and neck, and two weeks after admission to the military hospital he developed rhinitis. A nasal swab was reported positive for *C. diphtheriae*, but the organisms were avirulent. After transfer to the isolation hospital skin swabs contained virulent *C. diphtheriae* (gravis type I), but throat and nose swabs were negative. The skin condition improved rapidly after the injection of 10,000 units of antitoxin.

Case 9.—Admitted to the military hospital with sycosis barbae. Three weeks later virulent *C. diphtheriae* (gravis type I) were isolated from the skin.

Case 10.—A case of impetigo of the face, neck, and left ear which developed a yellowish-white membrane on the skin behind the left ear one month after admission to the military hospital. A swab from this membrane was found to contain avirulent *C. diphtheriae*. At the isolation hospital only diphtheroids were found in swabs from the skin until one month later, when virulent mitis organisms were reported, presumably due to cross-infection. The skin healed in three weeks.

Case 11.—Admitted to the military hospital with seborrhoea capitis. Three weeks later conjunctivitis developed and virulent *C. diphtheriae* (gravis) were found in the purulent discharge. Swabs taken at the isolation hospital were negative, and the conjunctivitis soon cleared up. 20,000 units of antitoxin were given.

Case 12.—Eleven weeks after admission to the military hospital for treatment of impetigo this patient developed a mild purulent conjunctivitis. The discharge contained avirulent *C. diphtheriae*. At the isolation hospital eye swabs were negative, but throat and nose swabs were positive on two occasions within a week of admission.

Case 13.—Admitted to the military hospital as a case of impetigo, this patient was swabbed and found to have *C. diphtheriae* (gravis) on the skin, but the organism proved to be avirulent.

Case 14.—This man had impetigo of the chin and face three weeks before and a sore throat two days before admission to the military hospital. Throat and skin swabs contained virulent *C. diphtheriae*. The skin persisted positive after the patient had been transferred to the isolation hospital, but swabs from the throat and nose were negative.

Case 15.—This man had impetigo for one month before admission to the military hospital. Five days after admission he complained of sore eyes, and his left eyelid was found to be scabbed. A swab from the eye contained virulent *C. diphtheriae*. At the isolation hospital throat and nose swabs contained virulent organisms of the same type as those found in the eye.

Case 16.—Admitted to the military hospital with sycosis barbae of nine months' duration, this man two months later developed purulent conjunctivitis, and *C. diphtheriae* was found in a swab from the eye. The organism proved to be avirulent.

Case 17.—Five days after admission to the military hospital for treatment of impetigo of the face a blister appeared on one knuckle of this man's right hand. A slough developed, and was found to be infected with virulent *C. diphtheriae*. The infection persisted after transfer of the patient to the isolation hospital, and on two occasions virulent organisms were found in the throat and nose without clinical evidence of infection.

Case 18.—This man had impetigo for three weeks before admission to the military hospital. After two weeks' treatment only slight crusting remained. Following contact with cases which proved to be diphtheritic infections *C. diphtheriae* were found in throat and skin swabs.

Case 19.—After three months' treatment for impetigo in the military hospital a lesion thought to be keloid developed on the neck. A scraping from the skin contained virulent *C. diphtheriae* of gravis type. Swabs at the isolation hospital were all negative, and the skin healed quickly after diphtheria antitoxin had been given.

Commentary

General Features.—No toxaemias could be ascribed to the action of diphtheria bacilli in any of these cases. No paralysis ensued. Membrane was seen in three cases of cutaneous infection (in one of these the diphtheria bacillus isolated was avirulent) and in one conjunctival infection. In all the other cases the lesions had the usual characteristics of the skin condition originally diagnosed. The average length of stay in the military hospital before transfer to the isolation hospital was four and a half weeks. The average in the latter hospital was six weeks.

Treatment.—In the isolation hospital diphtheria antitoxin was injected intramuscularly in every case. The other treatment was that usually given for the particular cutaneous or conjunctival infection.

Infectivity.—It is of interest to note that in addition to the 19 cases mentioned above there were admitted from the military hospital during the same period 18 other cases of diphtheria, including 7 of the staff. These 18 cases were faucial infections in all but one instance, the latter being a case of rhinitis.

Conclusion.—Recognition of cutaneous diphtheria among patients with a variety of skin infections suggests the need for more frequent bacteriological investigation of such cases.

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ACUTE ALEUKAEMIC MYELOID LEUKAEMIA

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The occurrence of acute myeloid leukaemia in the aleukaemic phase during adult life is rare enough to make the following cases worth reporting.

Case I

A man 63 years old, a window-cleaner by trade, was admitted to the Royal Hospital on Sept. 13, 1942, with a history of a severe sore throat and difficulty in speaking for the past two weeks. These symptoms became progressively worse, and one week before admission he complained of severe malaise and generalized pains over the body; the temperature was then found to be 103° F. Five days before admission a haemorrhagic rash appeared on the legs and arms; this became purple after 48 hours. On the day of admission he complained of headache, shortness of breath, and stiffness of the neck. During the illness he became increasingly drowsy, but could be roused and was quite rational. He had been on a course of sulphanilamide (1 g. four-hourly) and vitamin C (150 mg. daily). Past and family history revealed no significant facts. Bowels and micturition had been normal; there was no loss of weight.

On admission the patient was very drowsy, but roused easily; temperature 102° F., pulse rate 94, and respiration rate 28 per minute. The legs showed a number of papulo-macular haemorrhagic spots with small yellow vesicular centres and irregular edges, located mainly over the shins; the size varied considerably, the largest being 1 cm. in diameter; there was no fading on pressure. The arms were covered with red indurated nodules larger than those observed on the legs, up to 2.5 cm. in diameter, chiefly localized around the elbow, resembling erythema nodosum and not showing the vesicular centre present in the leg lesions. There were also a few macular spots on the back and abdomen. The limbs presented cogwheel rigidity and the joints were very tender on movement. In spite of the increased respiration rate there was no clinical evidence of abnormalities in the respiratory system. Heart and vessels normal; blood pressure 120/70; spleen and liver not palpable; no glandular enlargement. Pupils and fundi normal; all reflexes normal; tongue and pharynx coated with dried mucus; breath fetid.

On the day after admission the patient developed herpes labialis, which later became haemorrhagic. Though remaining rational he became progressively more drowsy and dyspnoeic; the pulse rate rose to 120 and the respirations to 40 a minute. Death took place on Sept. 17.

The laboratory investigations carried out in the short period of time during which the patient was under observation showed: No abnormalities in the urine except a large amount of urobilin; haemoglobin, 62%; red cells, 3,940,000 per c.mm.; mean diameter of the red cells, 7 μ; white cells, 2,800 per c.mm.—polymorphs 18%, eosinophils 1%, mononuclear cells 81%. Some of the mononuclear cells were typical lymphocytes, but the great majority were of primitive type; one normoblast was seen while counting 100 white cells; platelets in the films appeared to be very scanty.

At first sight the primitive cells were taken to belong to the lymphatic series; but on account of the presence of azur granules in the more immature forms it was decided to investigate the case more fully by means of sternal puncture and the peroxidase reaction. Sternal puncture, performed on Sept. 15, showed: primitive cells

(haemocytoblasts) 42.5%, myeloblasts 35.5%, premyelocytes 15%, myelocytes 0.5%, polymorphs 1.5%, lymphocytes 1.5%, monocytes 0.5%, basophils 1%, plasma cells 0.5%, normoblasts 1.5%. About 60% of the nucleated cells in the bone-marrow films showed the presence of peroxidase-positive granules. On Sept. 16 the white cells numbered 2,500 per c.mm., of which 85% gave positive peroxidase-stained granules. The differential count showed: haemocytoblasts 10%, myeloblasts 32%, premyelocytes 45%, myelocytes 3%, polymorphs 6%, lymphocytes 4%; two normoblasts were seen while counting 100 white cells.

Post-mortem examination on Sept. 17 revealed complete consolidation of the left lung, a few haemorrhages in the left parietal pleura and into the mesenteric fat, spleen slightly enlarged and soft, and bone marrow brownish pink in colour; no other macroscopic abnormalities. The previously described lesions of the skin of the limbs were still present but had become more purple, and those of the legs had lost the vesiculation in the centre.

Histological sections from the skin lesions showed infiltration of the corium with leucocytic cells surrounded by a zone of haemorrhage. The kidney, liver, and spleen contained a very few scattered foci of leucopoiesis. The lung showed the alveoli filled with fibrinous acellular exudate with little inflammatory reaction.

After the report on this case had been submitted for publication, a second case presenting similar haematological features was seen by one of us (B. L. D. V.).

Case II

A man 41 years old, who had been complaining of lassitude for two to three months and severe headache for the last fortnight, presented the following blood picture when first seen: haemoglobin, 34%; red cells, 1,640,000 per c.mm.; white cells, 10,200 per c.mm. —haemocytoblasts 16%, myeloblasts 42%, myelocytes 2%, polymorphs 14%, lymphocytes 25%, monocytes 1%. Except for marked pallor nothing abnormal could be detected on general examination: spleen and liver were not palpable, and there was no glandular enlargement. Sternal puncture showed a picture very similar to that of the peripheral blood, possibly through the marrow sample being heavily contaminated with peripheral blood. The primitive immature cells were almost identical with those observed in the previous case, and were correctly diagnosed only by means of the peroxidase stain.

White cell counts during the patient's stay in hospital showed variations between 6,800 and 18,600 per c.mm. He was given a large blood transfusion when his red cells reached the level of about 1,000,000 per c.mm., and was sent home, his general condition being much improved. When last seen his white cells had risen to a level of 50,000 per c.mm. with over 80% of very primitive mononuclear forms.

This case also, although not strictly comparable to the first because of the rise in white cells following the transfusion, when first seen in the aleukaemic phase presented a blood picture hardly distinguishable from that of lymphatic leukaemia without the aid of the peroxidase stain.

Conclusion

Both these cases are of interest in showing the "hiatus leukaemicus" of Naegeli, consisting of the presence in the peripheral blood of primitive cells and mature forms with few or no intermediate stages. The acuteness of the leukaemic process coupled with a very low white cell count as found in Case I is an uncommon feature. The bone marrow showed definite and marked leukaemic change, but other organs presented little leukaemic infiltration. The low white cell count may have been due either to the minimal leukaemic involvement throughout the body or to the destruction of the immature circulating cells by the spleen, itself not yet involved in the process.

It is worth noting that in both cases the peroxidase stain was essential for the correct classification of the immature cells, which might at first sight have been thought to belong to the lymphatic order.

We are indebted to Dr. J. H. Sheldon, honorary physician, and Dr. S. C. Dyke, pathologist to the Royal Hospital, Wolverhampton, for permission to publish these cases and for much helpful criticism.

S. M. Feinberg and others (*Ann. intern. Med.*, 1943, **18**, 311), recording 8 cases of allergic reaction to injected liver extract, suggest that this type of allergy is not uncommon. Their tests indicated that it is neither a species specificity nor an organ specificity involving the usual protein antigen. They believe that the allergic response is to "a special fraction of an organ (liver) not bound with the ordinary protein fractions but associated with the anti-anaemia fraction."

THE DIETARY FACTOR IN REPRODUCTION AND LACTATION

BY

MARION B. RICHARDS, M.A., D.Sc.

(From the Rowett Research Institute, Aberdeen)

Any investigation into the causes of high infant mortality must take account of nutritional factors. Direct proof of the extent of their influence on human beings is hard to obtain, but by means of experiments on small animals, in which environment and diet are strictly controlled, it is possible to obtain valuable information regarding the effects of a deficient diet on breeding performance, and the possibilities of remedying the deficiencies by means of suitable supplements.

A recent breeding experiment on rats carried out at this Institute has given results which seem to be of considerable practical importance at the present time. This was a long-term experiment in which the females, mated at 100 days of age after being on their experimental diets from weaning, were carried through three successive matings. The object was to determine the effect on reproduction in rats of supplementing a poor human dietary by additions of inorganic calcium and vitamin B_1, given separately and in conjunction; to test the effect of dried yeast as a source of vitamin B_1 and other factors; and further to test the influence during the breeding period of an increased milk intake along with these supplements.

The basal diet was that employed in the growth tests on rats recently reported (*Journal*, 1943, **1**, 161), and represents the average diet of households spending from 3s. to 7s. per head weekly on food. This diet contains milk equivalent to a weekly intake of 3 pints per person, and from the date of mating each group of rats was subdivided, half the animals, both male and female, receiving thereafter a doubled supply of milk.

Table I gives a brief summary of the results of the breeding test, combining the figures for three matings and rejecting animals which failed to produce three litters within six months. It is our practice to reduce all larger litters to 8 on the day after birth—a fact to be remembered in regard to the number of rats reared per litter.

TABLE I.—*Showing Breeding Results for Three Consecutive Matings*

Group	Dietary Supplements	Litters Born and Litters of 8 Reared	Aver. No. Born Alive per Litter	Aver. No. Born Dead per Litter	Aver. No. Reared per Litter Born	Aver. Weaning Wt. per Rat (Litters of 8) (g.)	Weights of Does	
							At First Mating (g.)	After Third Lactation* (g.)
IIA ..	—	24/4	6·9	0·8	5·4	33·6	185	228
II ..	Milk	30/14	8·8	0·5	6·3	39·1	186	255
IVA ..	Ca	27/13	8·6	0·3	6·9	35·1	202	239
IV ..	Ca+milk	21/14	9·2	0·5	7·4	40·5	196	273
IA ..	Aneurin	27/15	8·0	1·9	6·2	32·2	186	214
I ..	Aneurin+milk	27/14	8·7	0·4	6·8	38·7	185	243
IIIA ..	Ca+aneurin	33/17	7·9	0·6	6·5	36·5	193	258
III ..	Ca+aneurin+milk	27/18	9·9	0·4	7·1	41·9	186	268
VA ..	Ca+yeast	30/25	9·8	0·6	7·4	40·9	206	266
V ..	Ca+yeast+milk	33/23	9·8	0·8	7·0	45·8	209	302

* After rearing litters of 6 to 8.

Effect of Extra Milk

Comparison of the results for the various pair-groups shows at once the beneficial effects of the milk supplement. This is particularly evident in all groups in the weights of the young at weaning and in the weights of the does after lactation. The milk supplement has increased the average weight of each young rat in litters of 8 by approximately 5 to 5½ g., making an increase of 40 to 44 g. for the litter. At the same time the does, in spite of rearing this greater weight of young, have made a greater increase in their own weights. The milk groups show also in general a higher number of young born alive per litter, and a higher proportion of litters of 8 reared. This is especially marked in the basal group, in which the number of young per litter born alive is raised from 6.9 to 8.8 by

addition of milk, and the proportion of litters of 8 reared is raised from 1 in 6 to 7 in 15. In the groups receiving calcium and yeast the diet has already been so much improved by these additions that the further addition of milk shows its effect mainly in the weight of the young at weaning, and in the high weight and excellent condition of the does after lactation.

Additions of Calcium and Aneurin

Addition of calcium alone to the basal ration has had a pronounced effect in increasing the number of live young per litter and in raising the proportion of litters of 8 reared, but these increases are no better than those effected by the simple addition of milk to the basal ration, while the increase in the weaning weight of the young due to the calcium supplement is much less than that effected in any of the pair-groups by addition of milk.

Addition of aneurin alone is of doubtful value. There was a considerable improvement, it is true, in the number of live young per litter and in the proportion of litters of 8 reared; but, on the other hand, the percentage of stillborn was high (18.7), the average weaning weight of the young and the weight of the does after lactation were both less than on the basal ration, and the condition of the does was poor. Keeping in view these harmful effects, it would seem that caution must be exercised in the addition of vitamin B_1 to a poor diet. Such improvements as are effected by the aneurin addition can be more simply attained by a milk supplement, and the group receiving both aneurin and milk was no better than that receiving milk alone.

The addition of calcium as well as aneurin reduced the percentage of stillborn (cf. IA and IIIA), and increased both the weaning weights of the young and the weights of the does after lactation. The gradation seen in the weaning weights in Groups IIA, IVA, and IIIA—33.6, 35.1, and 36.5—is repeated in the corresponding groups with extra milk—39.1, 40.5, and 41.9.

Addition of Calcium and Yeast

Direct comparison of Group VA with Group IIA brings out very clearly the great improvement in the diet brought about by the addition of calcium and yeast. The number of live young per litter is increased from 6.9 to 9.8, the proportion of litters of 8 reared is raised from 1/6 to 5/6, while the average weaning weight per rat in litters of 8 is 7.3 g. more, representing an increase of over 58 g. for the whole litter. The addition of milk to the calcium and yeast group brings this increase per rat up to 12.2 g., making the weaning weight 45.8, which is approximately the average weight of a stock rat at weaning.

The groups receiving calcium and yeast were outstanding throughout the experiment. In their appearance and general performance, especially Group V, they were quite comparable with stock rats.

One of the most noteworthy points in the experiment was the striking difference in the condition of the does after lactation. In Groups IA and IIA some of the does were in such a limp and exhausted condition after rearing their litters that they had to be given a few days' rest before remating—a procedure which was unnecessary in the corresponding groups receiving the extra supply of milk. The differences in the condition of the does may be gauged by the differences in their average weights after rearing litters of 6 to 8 in the third mating. Thus in Group V the average weight of such does is 302 g., as compared with 228 g. and 214 g. in Groups IIA and IA.

The results indicate that the yeast supplement has made good certain deficiencies in the diet not already supplied by the calcium, milk, and aneurin, and that the simultaneous addition of calcium, yeast, and milk has converted a poor diet into one on which the breeding performance is on a par with that of stock rats.

Deaths during the Suckling Period

During these breeding tests it was noted that in a number of cases one or more rats in a litter died, without any apparent cause, within a few days of weaning age. These deaths occurred almost entirely in the groups receiving the unsupplemented basal ration, and in this respect the milk subgroup was no better than that without the extra milk. In Table II are given the number of deaths that occurred among the sucklings at different periods, ignoring the first 24 hours after birth, when accidental deaths are apt to occur, especially with large litters.

TABLE II.—*Deaths during Suckling Periods*

Groups	Supplements	No. of Does	No. of Young		Deaths during Suckling			
			Born Alive	In Reduced Litters (after 24 Hrs.)	2–6 Days	7–11 Days	12–23 Days	Total
II and IIA	—	18	431	356	20	3	16	39
IV and IVA	Ca	16	425	354	8	3	0	11
I and IA	Aneurin	18	451	361	7	0	3	10
III and IIIA	Ca+aneurin	20	529	416	9	1	0	10
V and VA	Ca+yeast	21	615	458	4	0	0	4

Although it is not unusual to have deaths occurring in the first few days of the suckling period, it is to be noted that even at this stage they are appreciably fewer in the groups receiving supplements. Deaths in the later stages do not normally occur with healthy animals, and the high number occurring on the basal ration in the latter half of the suckling period is undoubtedly of significance. It will be seen that in the groups receiving Ca alone, Ca with aneurin, or Ca with yeast there was no death at all during this period. Further, in the yeast groups the total number of deaths is very small relatively to the large number of young reared, and there was no death after the first few days.

Conclusion

These records show clearly the importance of the diet in matters concerning breeding performance in animals in controlled environment, and indicate the large part it may possibly play in the problem of infant mortality in human beings. While it is disquieting to reflect that the basal diet used in these experiments is not that of the poorest classes in the community but is representative of the diet of large masses of our population, the fact that it may be radically improved, for experiments on animals, by the addition of such simple supplements as inorganic calcium, milk, and dried yeast gives ground for the hope that it may be similarly improved for purposes of human nutrition. Recent dietary surveys have indeed shown that the diet of pregnant and nursing women of this socio-economic group has been improved during the war by means of the milk priority scheme and by the introduction of national wheatmeal bread. Moreover, despite adverse housing conditions, restricted medical service, and an increase in the number of married women going out to work, the infant mortality rate in Scotland for 1942 fell to 69 per 1,000 live births, a figure equal to that for 1939, which was the lowest recorded up to that date; while in England and Wales the rate for 1942 was the lowest ever recorded. Our experimental results show the possibility of a connexion between these two sets of facts, and indicate how further improvements in the diet may be effected. At the same time they provide useful pointers for the post-war feeding of the starved populations in Europe.

METALLIC INTERNAL FIXATION OF FRACTURES IN AIR-CREW CASES

BY

N. VERE-HODGE, M.B., B.Chir., F.R.C.S.

Squadron Leader, R.A.F.V.R.

Internal fixation of fractures with metal plates and screws has been coming more and more into use for several years, with the result that an ever-increasing number of men are working with metal plates and screws in their limbs. Until recently the metals available showed a slight reaction within the body tissues, though not necessarily enough to interfere with their usefulness. Within the last ten years an alloy—vitallium—has been produced which is inactive in body tissues.

The discovery of vitallium has given further impetus to the use of metal internal splintage of fractures. During the present war a very large number of fractures have occurred

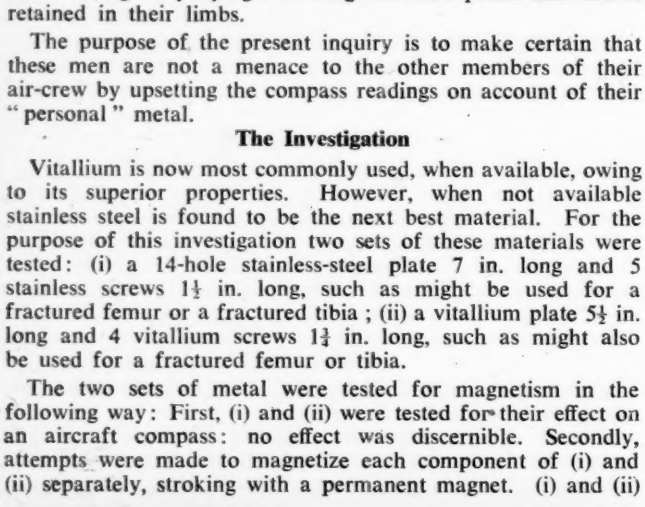
in men of the younger age groups. It is vitally important to the war effort that they should be returned to duty as soon as possible and with the minimum functional disability. It is with this end in view that certain types of fractures are being treated with internal fixation by vitallium plates and screws. In the R.A.F. many air-crew fracture cases have been treated with vitallium plates and screws. After the stage of full rehabilitation has been reached the airman returns to his unit to resume flying. In consequence numerous air-crew members are now regularly flying with large metallic plates and screws retained in their limbs.

The purpose of the present inquiry is to make certain that these men are not a menace to the other members of their air-crew by upsetting the compass readings on account of their "personal" metal.

The Investigation

Vitallium is now most commonly used, when available, owing to its superior properties. However, when not available stainless steel is found to be the next best material. For the purpose of this investigation two sets of these materials were tested: (i) a 14-hole stainless-steel plate 7 in. long and 5 stainless screws 1½ in. long, such as might be used for a fractured femur or a fractured tibia; (ii) a vitallium plate 5½ in. long and 4 vitallium screws 1¾ in. long, such as might also be used for a fractured femur or tibia.

The two sets of metal were tested for magnetism in the following way: First, (i) and (ii) were tested for their effect on an aircraft compass: no effect was discernible. Secondly, attempts were made to magnetize each component of (i) and (ii) separately, stroking with a permanent magnet. (i) and (ii)



Photograph of vitallium and stainless-steel plates and screws.

were then tested for their effect on an aircraft compass, and again no deviation was discernible. Thirdly, the components of (i) and (ii) were treated by a high-power remagnetizing plant. After this treatment (i) and (ii) were retested for their effect on an aircraft compass. The position adopted in relation to the compass needle was with the nearest end of the component 6 in. distant from and level with the centre of the compass bowl, with the ends of the component under test at right angles to the axis of the compass needle. Three days were allowed for natural demagnetization. At the end of three days the results were:

	Compass Deviation*	
(*a*) Stainless steel plate	+2°	−2°
(*b*) Stainless steel screws, No. 1	nil	nil
,, ,, ,, No. 2	+2°	−2°
,, ,, ,, No. 3	nil	nil
,, ,, ,, No. 4	nil	nil
,, ,, ,, No. 5	+2°	−2°
(*c*) Vitallium plate	nil	nil
(*d*) Vitallium screws	nil	nil

* Second figure obtained with polarity reversed.

From these tests it is found that the stainless-steel plate, though difficult to magnetize, after being magnetized has an appreciable effect upon a compass, and it cannot be demagnetized by ordinary methods such as mechanical vibration or striking with a hammer. Although two of the stainless-steel screws retained their magnetism for three days to the same extent as the plate, they are likely to lose it in a short time, as the other three screws did. The vitallium plate and screws could not be magnetized by these powerful methods.

To complete these tests several airmen with stainless-steel or vitallium plates and screws in their upper or lower extremities have been tested against an aircraft compass. In all cases there has been no deviation of the compass needle.

Conclusions

These tests show that vitallium plates and screws are entirely safe as regards magnetism when used for treatment of fractures in men who fly aircraft.

Stainless-steel plates and screws are magnetized only with the greatest difficulty, and then tend to lose their magnetism gradually. When handled by the usual surgical methods it is extremely unlikely that they would affect an aircraft compass.

As a result of the tests on the magnetic properties of these metals, surgeons should feel quite justified in leaving any vitallium or stainless steel in the limbs of their fracture cases, and there is no indication for removal of either of these metals before returning the men to full flying duties.

I wish to thank Group Captain J. M. H. Whitworth, D.S.O., D.F.C., for his help in carrying out the tests which form the basis of this report; also the Director-General of Medical Services, R.A.F., for permission to publish this report.

Medical Memoranda

Incidence of Syphilis among Juvenile Defectives

The following is a record of the blood Wassermann reaction of juvenile patients admitted to the Fountain Hospital from the years 1938 to 1942 inclusive. All were mental defectives, mostly of the lowest grade.

Year	Admissions	Positive W.R.	Average Age
			yrs. mths.
1938	80	—	4 3
1939	175	2	7 7
1940	98	—	4 6
1941	45	2	4 9
1942	114	—	4 9
Total ..	512	4	5 6

These results are of interest because of the low incidence (0.78%) of syphilis that they reveal, and they provide some evidence on the question of the general incidence of syphilis. Many of these patients have parents with some degree of amentia, and it might be expected that a general increase in syphilis would particularly affect these members of the population and would be reflected in an increase of congenital syphilis in their children. However, the figures indicate that congenital syphilis is not now the important factor in the aetiology of low-grade amentia that it formerly was, for it seems that among older mental defectives a positive blood W.R. is much commoner than in this group.

Syphilis would therefore appear to be decreasing among the parents of mental defectives, although a possible alternative explanation of the results is that an increasing proportion of mothers may be seeking ante-natal examination and receiving successful treatment if syphilitic.

It is interesting to note that extremely inconsistent results have been obtained by different observers in this matter. Penrose (1933) gives a table of findings of positive W.R. in groups of defectives varying from 1.5 to 55%, the smallest percentages being in the largest groups. Other authorities seem to regard 10% as a fair average.

J. LLOYD, M.D., M.R.C.P.

REFERENCE

Penrose, L. S. (1933). *Mental Defect*, p. 38, London.

Reviews

THE INNER EAR

The Inner Ear, including Otoneurology, Otosurgery, and Problems in Modern Warfare. By Joseph Fischer, M.D., and Louis E. Wolfson, M.D. (Pp. 421; illustrated. $5.75.) New York: Grune and Stratton Inc.

The authors of this book have tried to draw a somewhat artificial distinction between the different parts of the ear—a distinction which is no doubt clear enough in the mind of the anatomist, but less so in the mind of the physiologist and the pathologist, and not recognized at all by Nature herself. The authors consider that the middle ear is sufficiently described in the ordinary textbooks of otology, but not so the inner ear, and they have attempted to supply the deficiency. The book, however, has resulted in a series of essays, each attributed to one or other of the authors, upon particular topics, and necessarily overlaps both by some repetition and by extension into subjects which are interesting and important but not strictly relevant. On the other hand, either some matters are omitted or their discussion is suddenly cut short, on the ground that the inner ear is not directly concerned. Thus there is a valuable chapter on chemotherapy, but this relates far more to general considerations, and to the middle ear in particular, than to the inner ear. In discussing intracranial complications the situation becomes still more illogical, for abscesses of the cerebrum, being usually secondary to disease of the middle ear, are dismissed briefly, while abscesses of the cerebellum, being more often a complication of infection in the labyrinth, receive much fuller treatment.

In view of the handicap which the authors imposed upon themselves, but have not strictly respected, they have produced a useful but from its very nature an ephemeral piece of literature, which would have been more readable had it been written better. It may perhaps be thought pedantic to insist too strongly upon this aspect of a medical book; but, apart from the pleasure and ease it gives to the reader, good writing demands clarity both of thought and of expression. The lack of these is only too evident and too frequent, the chapter on meningitis being a conspicuous example, and that on Ménière's syndrome another. The authors, however, have made a gallant attempt at the exposition of an extraordinarily difficult subject and display a profound knowledge of the pathological changes that occur in the inner ear. The publishers have given generous support, but the numerous illustrations of morbid anatomy, chosen from the authors' own collection, mostly convey very little to the reader, whereas stereoscopic illustrations would have provided that additional help to the eyes necessary for the appreciation of labyrinthine pathology. In the matter of references, which are a cardinal part of such a book, we find much to criticize, for numerous authors are mentioned in the text without acknowledgment in the references, and, on the other hand, authors appear in the references without mention in the text. Although the defects of the book are evident enough, it does reveal a comprehensive effort to describe from many points of view a subject in which great advances have been made in recent years, in which many problems are still unsolved, and many observations still appear contradictory. The authors at least have not been overwhelmed by the difficulty of their task and the many uncertainties that confronted them.

HUMAN INHERITANCE

The Treasury of Human Inheritance. Edited by R. A. Fisher, F.R.S. Volume IV. Nervous Diseases and Muscular Dystrophies. Part IV: On Pseudohypertrophic and Allied Types of Progressive Muscular Dystrophy. By Julia Bell, M.A., F.R.C.P. With Pedigree Plates XXXIII to XLIV; Figs. 567 to 839. (Pp. 58. 12s. 6d.) Cambridge: The University Press. 1943.

In previous reviews and annotations we have found much to praise in this beautifully produced series of monographs. The present example does not fall short of its predecessors either in the manner in which an extensive literature is summarized and presented or in the interest of Miss Bell's brief introductory remarks. She shows that it is possible to group cases of progressive muscular dystrophy into three fairly distinct clinical types. This differentiation, though imperfect, does show a marked correspondence with the mode of transmission, which, as is so often the case in the human subject, may be different in different families. Recessive cases are commonest, though the more striking sex-linked pedigrees have been more frequently recorded. Dominant cases are very rare, though direct transmission, when it does occur, may lead to very large numbers of affected persons in a single family group, and in a civilized community the pedigree will almost certainly appear in the medical literature. Thus three genes at least may produce the condition, but the number is greater than this, for the correlations between members of a single family group as regards both age at onset and age at death are very high. This is an indication that even within the limits of one mode of transmission different genes are at work in different families.

Once again the value of the monograph is enhanced by the inclusion of a series of consecutive cases, 113 in number, seen at the National Hospital, Queen Square. The pedigrees are, as always, clearly presented, there is a full bibliography with an index, and extensive summaries are given of the original clinical notes. This publication is a welcome addition to the *Treasury* which Prof. Karl Pearson inaugurated and which has been continued on the same generous scale by Prof. R. A. Fisher, his successor in the editorship.

"ROSE AND CARLESS"

Rose and Carless Manual of Surgery for Students and Practitioners. By Cecil P. G. Wakeley, F.R.C.S., and John B. Hunter, M.Chir., F.R.C.S. Volumes 1 and 2. Seventeenth edition. (Pp. 1,766; illustrated. 35s.) London: Baillière, Tindall and Cox. 1943.

A book that reaches its seventeenth edition in forty-five years must have many virtues to account for its prolonged success. This is certainly true of Rose and Carless's *Manual of Surgery*, so well known to all the older generation of doctors. When it first appeared in 1898, and for many years afterwards, its popularity was unchallenged; within recent years, however, some formidable rivals have come to dispute its supremacy. There can be no doubt that the modern student is inclined to look with less favour upon "Rose and Carless" than did his father. The reviewer was reared on this surgical vademecum and has in consequence always felt a great and friendly interest in its fortunes. For that reason the present edition has been examined critically to see if any change in its character could be detected to account for the loss of popularity among students and teachers, for at its inception this book was a considerable contribution to the education and teaching of the aspirant to surgery. It will be seen, therefore, that any criticism is inspired by friendliness and proffered in a spirit of helpfulness.

The most significant change to be noted is a tendency to loss of balance, uncommon conditions being sometimes given two or three pages of description and fully illustrated, when really important, but perhaps somewhat less interesting, diseases are inadequately dealt with. In a short review it is not possible to give more than two examples of this. Under the heading "Varicose Veins" surgical treatment is dismissed by the statement, "Excision of varicose veins, although practised extensively in the past, has been entirely replaced by injection treatment"; no mention is made of the Trendelenburg operation, which, combined with injection, is now probably one of the most frequently performed and successful methods of dealing with many cases. Yet we have an account and a good illustration of intramedullary tractotomy in the treatment of trigeminal neuralgia, while pineal tumours occupy some five pages of text and illustrations. Again, there is no mention of excision as a method of treatment of fractured patella, though this has now been used long enough to prove its value in suitable cases, but Dandy's method of treating hydrocephalus by cauterization of the choroidal plexus through a ventriculoscope is thought worthy of both description and illustration. In extenuation the authors explain in the preface that the revision for this edition has not been as thorough as they would have liked owing to wartime conditions.

The illustrations are good; it is pleasing to see that some of the originals have stood the test of time and still appear. The general production also is good, and the continued use of surfaced paper has enabled the illustrations, both coloured and plain, including the radiographs, to reproduce well. Despite the criticisms, therefore, we still think that "Rose and Carless" is a very fine representative of the English student's textbook of surgery; he is unlikely to go far wrong in following its precepts.

Notes on Books

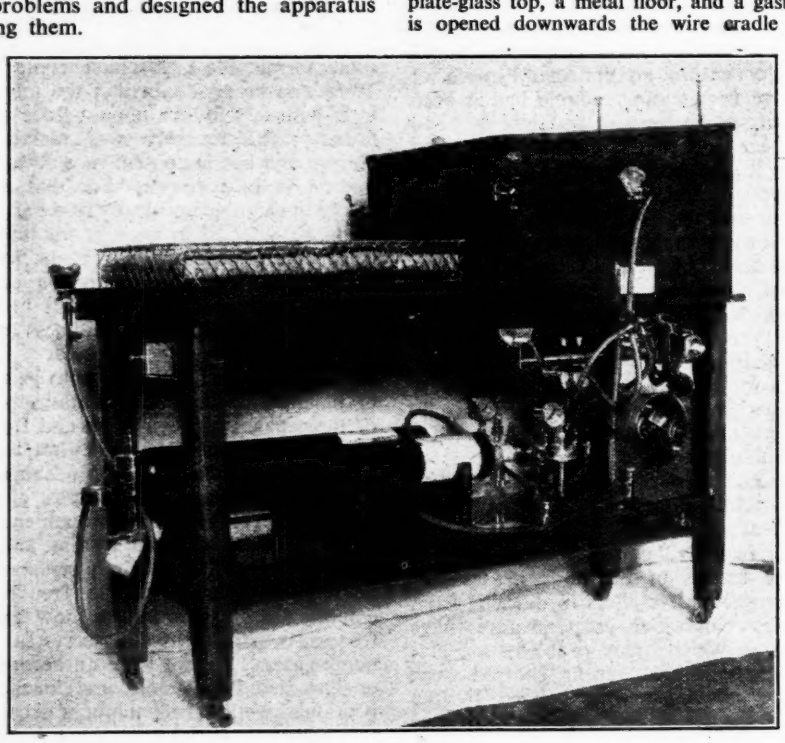
Minor Surgery, the latest of the handbook series to be published by the *Practitioner* (Eyre and Spottiswoode, 16s.), is launched with an introduction from Sir Alfred Webb-Johnson, P.R.C.S., whose quotation from the Prayer Book on the honourable estate of matrimony applies equally well to the high standard which should be expected in performing even the so-called minor procedures of surgery. The book is composed of revised articles which originally appeared month by month in our contemporary. Fractures are not dealt with, as these comprise a separate and recently published book which has already been noticed in this column. As samples of the eighteen chapters which comprise the present book we may mention: varicose veins, ulcers, and phlebitis, written by Reginald Payne; gynaecology, by Douglas Macleod; wounds, by C. P. G. Wakeley; anaesthesia and analgesia, by C. Langton Hewer; the eye, by J. S. Arkle; the ear, by C. P. Wilson; sprains, by G. R. Girdlestone; and minor surgery of the genito-urinary system, by Clifford Morson. Bursae and ganglia make an interesting article by H. Jackson Burrows, and skin infections by Prof. Rendle Short should be most helpful to the general practitioner, whom most of the authors apparently have in mind and who is likely to benefit most from the book. Wartime economy has required the illustrations to be grouped together into a series of plates, but these are well produced, and the whole forms a very convenient little book in which practitioners will find well-written and brief accounts of modern methods of dealing with those apparently trivial, but in reality by no means trivial, maladies which may cause him to enter the realms of surgery, even if it is not to proceed very far therein.

Preparations and Appliances

RESUSCITATION AND OXYGEN-THERAPY APPARATUS FOR INFANTS

Dr. RODERICK H. O'HANLON, late auxiliary medical officer, Rotunda Hospital, writes:

The accompanying photograph illustrates the combined resuscitation and oxygen-therapy apparatus for infants now in service at the Rotunda Hospital, Dublin. Experience at the Rotunda has demonstrated the great value of oxygen in the treatment of all cases of critical asphyxia in the newly born, but the apparatus employed heretofore was unable to cope with the many practical problems which arise in the administration of oxygen to the infant (as distinguished from the adult), and particularly in the treatment of the premature infant. During my term of office as auxiliary medical officer at the Rotunda and under the direction of the Master, Dr. Ninian Falkiner, I made a study of these problems and designed the apparatus with a view to overcoming them.



The resuscitation unit is an adaptation of the method devised originally by Dame Louise McIlroy, and employs a predetermined mixture of oxygen and carbon dioxide in association with a mechanical frequency indicator to assist the operator in regulating application to conform with the normal breathing rate. The cylinder containing the mixture is fitted with an automatic reducing valve, and therefrom a baffled flexible pipe line leads to a pistol-grip trigger-valve and to a baby's anaesthetic mask. After a thorough clearance of the respiratory passages by means of a mucus catheter the infant is placed in the cradle with suitable coverings to promote warmth. The mask is then applied and removed at intervals signified by the frequency indicator. Pressure on the trigger-valve permits a volume of gas to escape just sufficient to produce a very slight positive pressure on the alveoli. Release of the trigger cuts off the flow of gases, and the flexibility of this arrangement, together with an intelligent use of the frequency device, makes it easy for an unpractised operator to develop a sound technique. While resuscitation is in progress the oxygen chamber may be warmed up and, when breathing has been initiated and established, the cradle containing the infant may be slid directly into the gas chamber without delay. The baby is then subjected to oxygen therapy under proper conditions of humidity and temperature for as long a period as may be desired.

The oxygen-therapy unit, which is an open circuit, comprises two oxygen cylinders fitted with reducing valves and cross-coupled in such a way that when one cylinder becomes empty the other cuts in automatically and starts to deliver gas. The empty cylinder may then be removed and a full one substituted in a few minutes, so that, if necessary, operation of the apparatus may be continued over a long period. The gas flowing from the cylinder goes to a standard adjustable flowmeter and thence to a standard humidifier to the injector, or, if desired in very hot weather, via a special insulated ice-box to the injector. The gas enters the chamber low down, so that the cold oxygen admitted lies on the bottom and the warm air is displaced upwards and passes out—thus keeping the loss of oxygen at a minimum during flooding. The temperature and humidity of the gas delivered to the chamber may be varied within limits. The chamber is flooded with known quantities of oxygen, depending on what initial concentration of oxygen is required. Thereafter it is maintained or varied by regulation of the injector. The gas chamber is constructed of hard wood with a plate-glass top, a metal floor, and a gastight door. When the door is opened downwards the wire cradle containing the infant and bedding may be slid in or out of the gas chamber on rollers running on slides. Wet-bulb and dry-bulb thermometers are fitted in such a way as to be easily read from outside the chamber. Immediately beneath the metal floor of the gas chamber two explosion-proof electric heaters are fitted on a metal reflector plate backed with asbestos and hard wood. These heaters are thermostatically controlled by two thermostats, one of which is variable between 67° F. and 77° F. and the other is a fixed or stand-by safety device to prevent the interior temperature of the chamber rising above 80° F. The thermostats may be regulated for higher temperatures if desired. In an emergency and for the treatment of a premature infant the temperature inside the chamber may be raised to the desired point very quickly, since the heaters are wired in such a way as to enable both or one or half of one to be put into operation by a convenient switch. Once the desired temperature has been obtained the power is cut down, and thereafter the temperature is maintained by the thermostat. Provision has been made for the important detail of intervenous drips to the infant during treatment in the gas chamber. The entire gas chamber may be tilted above the horizontal by turning a handle. Since the cradle is reversible the body of the infant may be inclined in either direction.

I have to acknowledge the kind co-operation of Mr. L. Veale of the Electricity Supply Board in regard to the heating arrangements, to thank Mr. Aitken and Mr. Swan of Medical Gases, Ltd., for the run of their laboratory for experiments, and to express my gratitude to Mr. Peter McCarthy of Messrs. O'Dea, Ltd., who undertook and completed the construction of the apparatus despite the drastic limitation of all supplies resulting from the war.

THE PUBLIC CORPORATION

BY

D. HARCOURT KITCHIN
Barrister-at-Law

[*Concluded from p. 400*]

The Assistance Board

The Assistance Board was set up under the Unemployment Assistance Act, 1934, to supplement the unemployment insurance scheme by assisting those who had exhausted their benefits or whose benefits were not enough, and so making it unnecessary for them to apply for public assistance. In 1940 the Board was renamed the "Assistance Board" and given the extra work of granting supplementary pensions to old age pensioners and elderly widows. Soon afterwards, by emergency legislation—the Prevention and Relief of Distress Rules—it was authorized to relieve any distress directly resulting from the war. As agent for the Ministry of Pensions it pays injury allowances to civilians injured by enemy action, and investigates applications made to the War Services Grants Committee. On behalf of the Board of Trade it makes grants to replace clothing and essential furniture destroyed in air raids.

The Board is composed of five members with long experience in social work, appointed by the Crown. It was originally responsible only to the Minister of Labour, but now no fewer than eight Ministers may speak for it in Parliament on the various aspects of its work. Its grants are paid through the labour exchanges or the post office. Dissatisfied applicants may appeal to a tribunal composed of an independent chairman, a representative of the Board (not in practice a member of it), and a representative of labour. The Board receives indispensable help from local advisory committees and from other statutory and voluntary social services. Its local administration is done by its paid staff, who are directly responsible to the central office.

The Assistance Board is perhaps more significant to the question of a medical services corporation than is any of the other bodies that have been described. It has no commercial functions but purely philanthropic ones. It has a nation-wide organization, and is financed entirely from the Treasury. It renders services that concern the intimate personal lives of very many subjects. Unfortunately, this particular Board, which contains a far closer precedent for the projected corporation than do any of the others, has aroused in its time far greater public hostility than have all the rest put together. It was created as an experimental means of dealing with a very urgent social problem—a large and growing number of persons unemployed through no fault of their own whose needs swamped the existing insurance scheme. It was the centre of very strong and widespread political emotion. Immediately it started its work it aroused a storm of fury among the unemployed and their political champions by paying many allowances smaller than the "transitional payments" which the applicants had previously been receiving. The Government would certainly have been defeated if it had not at once suspended the operation of the Board by the famous "Standstill," fictionally a decision of the Board to pay allowances at transitional rates until a new set of regulations could be adopted.

The "Standstill" lasted for two years, and since its ending with the introduction of a more generous scale of allowances and better regulations the Board has gradually won for itself general public confidence and approval. The crisis at its birth was not due to its form or constitution, but to the insufficiency of the funds which the Government and Treasury were willing to allot to it, to the inevitable inexperience of its staff in the use of discretion, and to the clumsiness of the Government in trying to shelter behind it. The Board has never had anything like the independence of the commercial public corporations, but none the less has learnt to do its work so well that it has been given heavy and important additional duties—not a bad test of the merits of an organization or an individual. The projected medical corporation might be similarly hampered by inadequacy of funds, and its work might be similarly bound up with politics. Its advocates would have to be prepared for close co-operation with the Minister and detailed scrutiny in Parliament at least for some years to come.

Agriculture in Wartime

It is profoundly interesting that one of the most striking examples of an independent body administering a public service should have arisen out of the needs of the country at war. At a time when the whole tendency of national administration is towards bureaucracy, the Minister of Agriculture and Fisheries, using his almost dictatorial powers, has created one of the freest and most democratic of all our public institutions. The County War Agricultural Executive Committees have succeeded in producing from the fields of the country an amount of food which no one before the war thought possible, and in immensely lightening our shipping problems.

The Defence Regulations made in Council under the Emergency Powers Act give the Minister of Agriculture (along with other Ministers) a very free hand in matters within his province. Under those powers Sir Reginald Dorman-Smith, himself a farmer, appointed in each administrative county a War Executive Committee, taking as a nucleus the members and staff of the existing agricultural committee of the county council and adding persons whose position in the agriculture of the county would make them valuable members. The executive committee works through a varying number of district committees appointed by itself from the principal farmers and landowners of the districts. (These are not the rural districts, but have been marked out *ad hoc*.) The district committees' functions are advisory only; the county executive committee has wide powers delegated to it by the Minister under various statutory Orders, but in general it is bound to obtain the approval of the Minister for very drastic actions, such as dispossession. Through its large and expert staff it is informed of every detail of the county's agriculture practically from day to day; it decides what shall be done with every acre of land and how many animals each farmer shall keep. It controls the issue of feeding stuffs and seed, subsidizes ploughing, sends machines and men to work where they are needed, and cultivates with its own labour pool large tracts of reclaimed land. It regulates its own procedure, chiefly on county council lines. Its legal status is obscure, for it was created by an executive, not a legislative, act of the Minister, and is probably not in law a corporation at all. It has no common seal, but acquires land and property by requisition as an agent of the Crown under the Minister's emergency powers. A person wishing to sue it issues his writ against the chairman and the executive officer. Nevertheless, it is so like a corporation in its structure and behaviour that it may fairly be treated as one.

Each executive committee is in constant touch with the Ministry through its officials, and is guided in policy, and no doubt also in many details of execution, by confidential circular. It constantly instructs and receives reports from its district committees. It appoints subcommittees to deal with different departments of its work, and their members spend much time on the land in contact with the farmers and labourers. Its patience, gentleness, and practical wisdom give the farmers that security and confidence which men must have if they are to create and produce. These wholly admirable qualities have flowered in a situation full of urgent compulsive necessity. Whether they could be evoked after the war, when they will appear to be merely desirable and not indispensable, is part of the fundamental question of our times.

Space does not permit more than the bare mention of the other little-known but useful public corporations like the Land Drainage Boards, the Coal Commission, the legal owner of the coal mines (appointed by the Board of Trade), the Herring Industry Board, the various agricultural marketing boards, and the War Damage Commission (appointed by the Treasury).

A Health Services Board

These are the chief examples of the public corporations at present working in this country. Obviously this form of administrative body can be successfully applied to a great variety of public services: to any service, in fact, which is vital to the public good and which implies a monopoly. None of the services rendered by the existing corporations, however, has much in common with the projected national medical service. Many new problems would be encountered in an attempt to organize a public corporation which should provide the comprehensive medical benefits of a scheme on the lines

of Sir William Beveridge's report, and in many ways such a body would differ from any of its predecessors.

The committee which met to design it would have first to settle its size and composition. None of the conditions which Gordon lays down as appropriate for a representative, as opposed to an appointed, board is here fulfilled. Geographically the work would extend over the whole country, the interests which could justly claim representation are innumerable, and the many million "consumers" of the services would be neither organized nor organizable. The board would have, then, to be appointed, but the drafting committee might well ask themselves whether the appointments should not follow a broad plan of representation—e.g., that a stated number of members must be medical, or that one or more members must be lawyers, or actuaries, or labour leaders, or women. The next question is who is to appoint these members. The committee would have to consider whether they could trust a Minister, or whether they would put responsibility for selection on the Crown—i.e., the Prime Minister after consultation with the members of the Government concerned—or on some special appointing body of eminent persons like that which fills vacancies in the L.P.T.B. They would then have to lay down the number of the board, remembering that it must be large enough for the necessary committee work and not so large as to cease to be a team.

Next, would the chairman be a whole-time salaried executive—a managing director as in the C.E.B.—or would he and the board direct policy through the executive officer? What would be the tenure of office and the salaries of the board? Should members of Parliament be excluded, and would it be necessary to forbid the retention by members of the board of any financial interest in the medical services? Who would have the right to remove a member from office for misconduct, incapacity, or absence? Would a retiring member be eligible for reappointment?

Then, what would be the manner of the board's responsibility to Parliament? In discussions on the formation of the board with representatives of the Government, it might perhaps be urged that the board should be entitled by statute to an actuarially just proportion of the contributions to the general insurance fund, and that this proportion should not be subject in lean times to the arbitrary raids by the Treasury which have so handicapped the B.B.C., or to the arbitrary reductions in allocated revenue which have so handicapped the Forestry Commission. It would thus not be dependent upon an arbitrary allocation, or subject to continuing control by either the Treasury or any other Department over the way it used its revenue, still less over its day-to-day administration. Granted that the board disposed of adequate financial, economic, and actuarial skill, experience, and advice, it should be left a free hand to make the best possible use of its resources. To tie its hands by detailed rules and restrictions would cripple its initiative, creative force, and effectiveness. It must not be made a subdepartment. So long as it showed each year that it had made reasonable use of the funds entrusted to it, the Treasury and the Ministry should leave it alone.

Who would be responsible to Parliament for the general policy of the board and speak there in its name? The Forestry Commission is represented by one of its number who is a member of Parliament and who interprets to it the will of the House. This arrangement, as the Commissioners' report says, works well enough; but the work of the Forestry Commission does not touch the individual intimate personal lives of millions of people, and cannot arouse the perpetual interest and controversy which would certainly surround the work of the projected board. The drafting committee might think it probable that neither Parliament nor public opinion would be satisfied with such a tenuous link as a parliamentary commissioner between the House and a board spending millions of pounds and caring in countless ways for the health of millions of citizens, but would demand that this vital service be supervised by a Minister of State. The Minister would presumably be the Minister of Health. Even if the Government saw fit to place, as has been suggested, the whole of the country's health services under the projected board, the Minister of Health would probably continue to exist in order to fulfil the many functions outside the health services proper which he now discharges. The suggestion has been made that the board should be placed under the supervision of the Privy Council, but the drafting committee would have to take account of a number of serious objections to this proposal. The Minister of Health certainly appears at first sight to be the most suitable constitutional guardian and spokesman of the new board.

The drafting committee would also have to plan the local ramifications of the board's structure: to decide whether all the board's activities should be directed from London and executed by its officers throughout the country, or whether regional satellite boards should be created, dependent on the central board for policy but autonomous in its execution. The committee might also make provision for the setting up of advisory committees. The board's powers to contract with persons and bodies for services and for the sale or lease of property would have to be precisely laid down, and arbitration and appellate mechanism devised. Its financial powers and duties would have to be set out in detail. The right of its employees to superannuation might also demand provision. When the drafting committee had settled these questions and produced a sound scheme and a draft Bill, the harder work of persuading the Government and Parliament to adopt it would begin.

Nova et Vetera

BRITISH AND AMERICAN MEDICINE YESTERDAY

A writer in the *Edinburgh Review* in 1820 concluded an article on American medical statistics with a series of rhetorical questions: "In the four quarters of the globe, who reads an American book? or goes to an American play? or looks at an American picture or statue? What does the world yet owe to American Physicians or Surgeons?" These questions reflected the European attitude towards the United States not merely during the beginning of the last century but well into this. To these slights Nathaniel Chapman answered in a characteristically American manner. In that same year he brought out a journal which was the precursor of the present *American Journal of the Medical Sciences*, and the title-page of the journal carried as its motto the quotation from the *Edinburgh Review*. No love was lost between the two English-speaking branches of medicine. Chapman in 1824 pointed out the "impertinence and presumption" of English critics. He claimed that a particular technique for the treatment of stricture of the urethra, said to have been first described by an English surgeon, was in fact described by an American the year before. Contemporary English medical literature provided Chapman with full opportunities for questioning English gentility. Thomas Wakley, founder of the *Lancet*, used choice descriptions such as "bats," "owls," "cocksparrows," and "ninny-hammers" for prominent British practitioners, and these appellations were matter that American critics were unlikely to ignore. Minor events, such as the exploits of John St. John Long, a brilliant charlatan who imposed on pre-Victorian society, were further grist to the American mill. Streaks of sanity did, however, occasionally break through on both sides. Wakley, in 1831, could praise the *American Journal of the Medical Sciences* as being "in most respects superior to the great majority of European works of the same description"; and an American editor in 1846 could make the common-sense observation, "Where is the American who would not be pleased, nay gratified, to see his works republished, with or without annotations, in Great Britain?" None the less, the dreary game of fault-finding went on throughout the century,[1] charges of ignorance and incompetence being apparently one of the main items of trade between the two countries. One of the earliest signs that this unedifying futility was subsiding was a comment in the *British Medical Journal* in 1883. "Medical journalism in America shows great activity," it says, and speaks approvingly of a series of American publications. In retrospect the Anglo-American hostility, as reflected in medical literature, had little to justify itself, and the conflict has ceased to have any meaning to the present generation, for the conditions from which it arose have long ago disappeared.

[1] *Bull. Hist. Med.* (*Baltimore*), 1941, **9**, 31.

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CORPORATION OR DEPARTMENT?

The "corporate body" advocated last week by the Representative Body as the most promising means of building and administering a national medical service is, strangely enough, no novelty. Nearly a hundred years ago, in 1848, this country had a General Board of Health. That board was not responsible to any Minister. The principle of Ministerial responsibility, now recognized as vital if the people are to retain any control over a highly specialized executive, was then fighting for existence against the principle of "expert" or "judicial" administration. The Board of Health, the Poor Law Commission, and other similar independent bodies were experiments in applying the second of these two theories to the problems of a new age. The Poor Law Commission perished in 1847 because, as Walter Bagehot[1] said, the House of Commons would not let it alone. In 1858 the Board of Health followed it, having lost its independence four years earlier. Those were the years of the *Communes* and Garibaldi: peoples all over Europe were revolting against autocratic rule, and modern democracy was being painfully born. Ministerial responsibility, however, has the defects of its qualities. Because a Minister knows that the most trivial act of any of his subordinates may lead to a question or derogatory speech in Parliament, he and his Department tend to aim at forestalling complaint rather than at achieving progress. Decisions are referred through an unwieldy hierarchical pyramid to the man at the top instead of being taken by the officer face to face with the problem. Overmuch labour is devoted to records and statistics. These and other drawbacks—not insuperable, nor peculiar to government by responsible Ministers—partly explain the survival of the public board as an administrative service, and its recent access of scope and importance. As a contributor has shown in these columns during the past fortnight, the variety of public services run by more or less autonomous boards is very large. It includes port facilities, the supply of water to London and electricity to the whole country, broadcasting, forestry, London passenger transport, wartime agriculture, produce marketing, land drainage, the relief of distress, and the control of the medical, dental, and nursing professions.

Superficially the autonomous board might seem to owe its success to its freedom from Parliamentary and Ministerial control over its day-to-day functions. Yet a closer examination shows this appearance to be a fallacy. The reverse is the fact: a board's immunity from Parliamentary criticism and Ministerial interference is earned by its success in satisfying the public. The Port of London Authority, the Metropolitan Water Board, and the London Passenger Transport Board have never excited much criticism in Parliament, just because their functions and their discharge of these have never aroused acute political controversy. When the British Broadcasting Corporation's charter was renewed seven years ago Parliament freely criticized its doings in detail. The Unemployment Assistance Board was set up in 1934 by a Government which was misguided enough to think it could escape the odium of reducing dole payments by giving the task to a theoretically independent body. This Board instantly became the centre of such a furious political storm that the Government escaped extinction only by suspending for two years its discretion to pay allowances lower than the transitional rate of benefit. The whole Parliamentary history of public boards from the earliest times shows that if Parliament really wants to scrutinize and criticize them Parliament will succeed in doing so just as if they were Government Departments run by a Minister. No statutory provision will avail to insulate them from substantial Parliamentary pressure, or from the consequent Ministerial pressure, without injuring the Government of the day. The utmost their autonomous status does is to enable a Minister to resist questions and criticisms which touch administrative detail and are not backed by any considerable public feeling. This protection from "sniping" is admittedly important to the quasi-commercial boards. Nevertheless, a board administering a comprehensive national health service under the Beveridge plan—a service which would affect nearly every citizen in the most intimate details of his life—would inevitably attract continuous and intense interest, criticism, controversy, and without doubt also hostility. Because most of its beneficiaries would belong to the poorer classes and many to trade unions, much of this feeling would be political in expression if not in origin. Unless the appropriate Minister were prepared to take the fullest responsibility for it, stand wide open to criticism of all kinds, and entertain willingly and positively every suggestion for improvement, the board would not live a month.

If, then, it is a fallacy to suppose that a corporate body created for this purpose could shelter behind its "independent" status, its creation would have to be justified on the ground that it would be likely to build and run a comprehensive national medical service more satisfactorily than a Government Department could. On this question there are two powerful and conflicting bodies of opinion. The advocates of the corporate body point to the shortcomings of Government Departments: their lack of initiative, their arrogance, dilatoriness, ignorance of real life, complacency, excessive centralization, parsimony, and other faults from which Departments suffer. They point on the other hand to the boldness, originality, and efficiency with which the London Passenger Transport Board, the B.B.C., and the War Agricultural Executive Committees have overcome difficulties, and the flexibility with which they tackle new problems and meet new demands. The advocates of the Government Department condemn the tendency of the independent and irremovable board to ignore or resist popular feeling, and its insulation from Parliamentary influence over such matters as its treatment of staff; they brand its relative autonomy as hostile to democratic principles, as the thin end of a Fascist wedge. They declare, moreover, that whatever may be said for "public" quasi-commercial services such as electrical supply and broadcasting, "social" services paid for by the State cannot be fittingly handed over to an autonomous board but should be run by a Department under a Minister fully responsible to Parliament. They assert that a Minister is able under the present departmental system to find sufficiently talented and creative persons within the Civil Service, and that he may also bring anyone he pleases into the Department *ad hoc* from outside; he may if he likes form them into a board, as in the Defence Departments or the Post Office, or he may adopt some other means of co-ordinating their work. These partisans of departmental enterprise point to the efficiency of the Post Office, the Stationery Office, the Children's Branch of the Home Office, and many other Departments.

[1] *The English Constitution*, p. 189.

The truth is probably that in running a social service far more depends upon the personal qualities of the administrators and far less upon the mechanism than is usually admitted. But the fact remains that on two occasions the Representative Body has voted in favour of a public corporation as the most satisfactory form for the central administration of medical and health services. The debate on this last week brought forth the highest level of utterance of the whole meeting. Those present listened with sustained interest. It is clear that behind the approval of a public corporation lay a deep-felt distrust of an unreformed Ministry of Health. And this was itself based on a still deeper distrust of the influence of party politics on the development of medicine, and also of the effect on it of the civil service mind and procedure. It seems clear that, until this question of central administration is settled to the satisfaction of the medical profession, no Government will be able to count upon the whole-hearted co-operation of the doctors of this country in working out plans for the development of a comprehensive medical service.

RESEARCH IN OPHTHALMOLOGY

As announced in the *Journal* of Sept. 18 the University of Oxford has launched an appeal for funds for the foundation of a Department for Ophthalmic Research after the war. This is an event of real significance deserving of every support. There is no doubt that during the last generation British ophthalmology has by no means distinguished itself in academic fields, however good it may have been in the practical side of the work of its exponents. Previously—indeed, ever since the study of the diseases of the eye had become a specialized branch of medicine in the middle of last century—the names of British pioneers were always of international repute; to-day these are the exception and the output of fundamental research has been scanty. It may be that to some extent this is explained by the fact that ophthalmology offers a ready economic opportunity to the newly qualified medical man because of the ease with which he can slip into the routine work of well-paid refraction clinics and thus can side-step junior hospital appointments with their facilities for research. But to a greater extent it is probably due to the undoubted dearth of the stimulus and opportunity for ophthalmic research in this country to-day.

There is no question that the problems awaiting solution in ophthalmology are many—in physiology, pathology, and therapeutics. The present appeal for funds for Oxford is addressed in the first place particularly to the industrial community, and it is obvious that the returns ophthalmology can give to industry are large. Most obvious is research on the prevention and cure of industrial diseases, particularly in such trades as chemicals and engineering. Mining is another example: thus recent research on the action of certain sulphonamides on infections of the cornea has resulted in the hypopyon ulcer so commonly met with in miners becoming an out-patient incident instead of an extremely serious disease usually leading to much permanent incapacity; while improved lighting has reduced to a very considerable extent the drain on the mining industry caused by heavy compensation for miners' nystagmus. Less obvious are the very great problems of factory illumination, a factor in industrial efficiency much neglected in this country, the value of which can be appreciated only by those who have experienced the increased output and improved morale which follow the application of scientific principles to the problem. Commercial aviation, moreover, involves a multitude of problems yet unsolved. It is interesting that a very large amount of yet unpublished research has been going on continuously since the war began to meet demands of the most varied nature from the three Services; few of these problems are not met with in some degree in times of peace, but hitherto it has required the urgent stimulus of war to excite active research to hasten their solution. The financial returns of such a policy carried on in normal times would be large. In this country four and a half million pounds are spent annually on the mitigation of the distress caused by blindness: the spending of a quarter of a million on the endowment of research as is asked by the University of Oxford may do not a little to reduce this bill, not to speak of the potentialities it may have as an investment in industrial progress.

If it is for the lay community to provide the opportunity, it is for the medical community to provide the stimulus and the spirit. The time is past when advances in knowledge could be attained by relatively simple methods by a single investigator; the great complexity of the problems now awaiting solution demands ever-increasing complexities in technique and ever finer methods of analysis which can be met only by a team working in close liaison with a whole congeries of related branches of science all working under a similar inspiration. Ophthalmological research must concern itself with the problems of biophysics and biochemistry, of physics and physiological optics, of pharmacology, bacteriology, and pathology, of embryology and genetics as well as of general medicine and surgery, and their investigation requires the laboratories of a university as well as the beds of a busy general hospital. In this country to-day there is only one university chair in ophthalmology—that at Glasgow. Oxford would be an ideal centre for teaching and research in the Provinces. The related sciences are fully represented and the atmosphere is pregnant with the spirit of research. A large general hospital is available, and next door to it and in close relation with it the Oxford Eye Hospital (due to be rebuilt through local appeal) still has the tradition of Menteith Ogilvie and Robert Doyne. Moreover, under the proposed regional scheme of the Joint Hospitals Board this hospital will assume greater importance by becoming the regional centre for the counties of Oxford, Buckingham, and Berkshire for ophthalmic work and teaching. To complete the scheme for the whole country, and to allow British post-war ophthalmology to assume its rightful place as a leader of progress throughout the Empire and the world, there remains to establish similar research and teaching facilities in London. It is to be hoped that this will not be too long delayed, though perhaps it will await the co-ordination and encouragement expected from the Goodenough report.

LORD DAWSON OUR PRESIDENT

The death of Sir Beckwith Whitehouse on July 28 left the British Medical Association without a President and (through the dislocations of wartime) without a President-Elect. In this unforeseen situation the Executive Committee took a bold and imaginative step. It proposed that Viscount Dawson of Penn, our President at the Centenary Meeting of 1932, and an old and tried member of Council, should be asked once again to wear the badge of office as titular head of the Association, this time not in an atmosphere of ceremony and rejoicing but in hard days of warfare and professional crisis. The Council with one accord approved this recommendation on the morning of September 21 and passed it on to the Representative Body, who less than an hour later unanimously elected Lord Dawson as President for 1943-4. On September 22 at the statutory Annual General Meeting of the Association he was inducted to the vacant chair and gave the address which we print at page 429 this week. Before the end of the last

war Lord Dawson had applied himself whole-heartedly to the future of medical and allied services, and his idea of the shape of things that might befall ran through the pages of the report of the Consultative Council to the Minister of Health, of which he was chairman. That report languished for 20 years in departmental files, even though in 1930 the B.M.A. put forward publicly its proposals for a general medical service for the nation, and later revised and amended them. Again, at the close of 1940, the B.M.A. broke once more into the long silence of Whitehall, and the Medical Planning Commission which was then set up had the advantage of Lord Dawson's help as one of its active and most influential members. The Interim Report of the Planning Commission and the Beveridge Report, soon to be followed now by the Government White Paper, have brought the whole matter into the forefront of medical politics and economics; and it can but be echoing the voice of the 44,300 members of the Association to say here how fortunate we are to have the senior medical statesman as our President in the difficult year to come.

ANILINE INTOXICATION

Aniline, like many other amido- and nitro-compounds of benzene, has long been known to cause symptoms of intoxication associated chiefly with its capacity for producing methaemoglobin. But this question of methaemoglobinaemia has been a matter of much discussion and controversy. While some authorities have been able to demonstrate its presence in man and in the dog—an animal known to form methaemoglobin readily—others have failed to produce it in other animals. Similar disagreement has arisen about the exact cause of death in acute aniline poisoning, whether from cardiac failure or from respiratory depression. A recent series of experiments[1] on dogs, with varying dosage and speed of administration of aniline, have gone far to solve many of these problems.

Briefly, it appears that aniline exerts its toxic action in two ways: first, indirectly, by the production of methaemoglobinaemia, with the consequent effects of oxygen deficiency on the various physiological systems; second, directly, in conditions of high concentration, by circulatory depression and cardiac arrhythmia. The formation of methaemoglobin is a direct effect not of aniline itself but of its conversion into an "active" compound, probably *p*-aminophenol, which forms methaemoglobin almost instantly *in vitro* in the presence of oxygen and very rapidly *in vivo*. One of the most striking features of the administration of aniline to dogs in these experiments was the "time lag" in the accumulation of the maximum methaemoglobin. Thus, administration of 10 mg. of aniline as a 2% solution in saline produced the maximum (about 20%) of methaemoglobin in two hours, while increasing the dosage up to 100 mg. resulted in a progressively greater methaemoglobinaemia (up to 70%) in periods up to eight hours. That this time lag was not entirely due to the time required for absorption was shown by a similar though less marked delay after intravenous administration. It is suggested, therefore, that the delay represents the time required for the conversion of aniline into the active agent, and that this is probably a catalytic effect. The most important effect of methaemoglobin anoxia is a progressive depression of the brain, and neurological signs appear when the methaemoglobinaemia is 55 to 60%, and unconsciousness at 70 to 75%.

Cardiac arrhythmias and circulatory depression are believed to be chiefly a direct aniline effect, though methaemoglobin anoxia, which also depresses the vasomotor centres and myocardium, demonstrated by fall of blood pressure and changes in the electrocardiogram, was undoubtedly an additive factor in their causation. Smaller doses of aniline were found to cause transient central nervous and circulatory stimulation, due primarily to action on the central nervous system: very large doses caused respiratory and circulatory depression, the latter due primarily to action on the heart.

[1] Clark, B. B., Van Loon, E. J., and Morrissey, R. W., *J. industr. Hyg.*, 1943, **25**, 1.

MANIPULATION OF BIRTH-WEIGHTS

Some weeks ago Dr. Letitia Fairfield drew attention in our correspondence columns (June 5, p. 706) to the practice of some midwives of making a routine deduction of four ounces or some such amount from the birth-weight of infants "to allow for the cord and meconium." This practice has been carried out in a number of maternity units without the knowledge of the responsible medical staff and sometimes without the knowledge of the matron or sister-in-charge. One domiciliary midwife employed by a local authority has explained that her custom has been to deduct nothing for stillborn or premature infants, but to take three ounces off babies of over five pounds in weight at birth, and to use her discretion in taking off more if the baby is very big. The reasons given for the practice are mainly two. The first is to avoid the worry which a fall in the baby's weight after birth is likely to cause to the mother. As to this it would surely be simpler for the midwife to reassure the mother by explaining the facts to her rather than to falsify the figures. The second reason is a more reprehensible one—namely, that the practice defeats an inconvenient hospital rule whereby babies are required to regain their birth-weight before discharge.

The Central Midwives Board has now been apprised of the practice and has issued a circular to the training schools stating that the Board requires the midwife to keep accurate and detailed records, and that the practice of making these deductions, besides being a contravention of the Board's requirements in this respect, makes the records valueless for the purpose of comparison and research. The attention of all midwives in the training schools is accordingly being directed to the requirement that the exact birth-weight shall be recorded as well as the exact subsequent weights. The Board's circular, however, will not necessarily reach midwives who are not attached to the training schools, and there may still be some difficulty in disposing of what seems to have become an occult professional tradition, to be conveyed from teacher to pupil, or from midwife to midwife, in a whisper, perhaps with some secret enjoyment at the idea of befooling a paediatrician who thinks that all infants should make arithmetical progress from birth onwards. It may be argued that the only harm done is in the field of statistics and records, which some midwives may regard as merely material for pigeon-holes. But the fact is that statistics is the groundwork of research, and in this instance certain theories regarding the feeding and care of infants have been built upon the weight chart without any idea on the part of the members of the medical profession concerned that in many cases the birth-weight had been marked down by 5% or so.

Presumably the light now thrown on the subject by Dr. Fairfield will lead to the abandonment of the practice so far as midwives employed in hospitals and maternity homes are concerned, but it may not be so easy to control the reckonings of the domiciliary midwife, who attends nearly two-thirds of the confinements in this country. A doctor called in by such a midwife might be well advised to ask her whether the weight chart owes anything to

imagination. Meanwhile one particular inquiry which was based upon 5,000 birth-weight records is wasted, and we are left wondering whether any other secret understandings lurk among those on whose indispensable and usually most efficient and loyal work the members of the medical profession have to rely. Is the temperature chart exempt from manipulation? This revelation concerning midwives is disconcerting not only because a good many carefully collected and collated statistics are vitiated but because it suggests a certain irresponsibility on the part of some women who enjoy the status of a profession and should be mindful of its obligations, and also because it discloses a failure on the part of the defaulting midwives to realize why babies are weighed or why records of weight are kept at all.

CO-OPERATIVE ANTIMALARIA WORK IN BENGAL

Perhaps owing to insufficient publicity the ordinary medical man in this country has little idea of the very considerable and highly developed organization which exists in India for the control of malaria in that country. In the first place, and naturally the most important, there is the Government organization against malaria which includes besides the different Provincial organizations or malaria departments under each Province and the malaria organizations of the great municipal cities like Bombay, the Central Government organization, the Malaria Institute of India, a great centre of research and control which is not only itself responsible for such huge antimalarial operations as those now being carried out at Delhi, but which advises and assists directly or indirectly almost every antimalarial activity throughout India. There is the excellent work of the Ross Institute carried out especially in connexion with the tea and other industries in Assam and South India. There are important and far-sighted field investigations under the Rockefeller Foundation. Nor does this exhaust the list, for there are many local activities of various kinds, among which may be mentioned a very interesting development in the rural districts of Bengal—viz., the Central Co-operative Antimalaria Society, Ltd. (of Bengal), which has now published its annual report for the twenty-second and twenty-third years of its existence. This society is probably unique of its kind. Bengal has an area about equal to that of England and Scotland, with a population, the densest in the world, of ninety millions. This population is mainly rural, living in scattered villages in country which has ever been the despair of the malariologist, since not only is it in parts an almost uninterrupted sea of riceland but it has become notorious for its malarious decaying rivers and their associated kaals and swamps, an expression of slow secular changes in the great Ganges delta. The Central Society with its 3,000 or so affiliated village antimalarial societies is, as its name implies, of a co-operative character, and it is closely linked with other co-operative activities. One of these, whose annual report was forwarded with that of the Central Society, is the Bengal Co-operative Home Crofters' Association, Ltd., a body which has as its object improvement of malaria indirectly through increased interest of the antimalarial societies and their individual members in intensive cultivation of land about the villages. None of these societies possesses large resources, and the main purpose of the Central Society is not so much to carry out large-scale operations itself, for which it has not the funds, but to create interest in antimalaria work in the villages, especially among the villagers themselves, and to push for urgently needed work in the direction of opening out and keeping clear dead river channels, draining or otherwise dealing with depressed areas and other conditions requiring improvement. It is clear from the reports that the Society's activities have the sympathy and support of many influential persons and Government, and it is to be hoped that a bid of this kind towards self-aid will receive the financial and other help which its meritorious objects deserve.

HEALTH OF HOSPITAL NURSES

A high standard of health supervision of nurses prevails at some hospitals, and for serious illness hospital nurses invariably receive medical and nursing care of a high order. But there is no generally accepted standard for the supervision of nurses' health. The requirements concerning medical examination of student nurses before admission vary at different hospitals, the practice with regard to immunization follows no general rule, and the keeping of health records is defective. A committee of King Edward's Hospital Fund for London, under the chairmanship of Sir Charlton Briscoe, has drawn up a memorandum with a view to securing an agreed minimum standard of health care.[1] The outstanding recommendations are that a physician should be appointed for the nursing staff, his responsibilities not to be limited to the treatment of the sick but to relate primarily to the maintenance of a good standard of health; that hospitals should require a detailed medical certificate with full family history from a nursing candidate's own doctor; that there should be a medical examination, with *x*-ray examination of the chest and a haemoglobin estimation, either shortly before or on admission; that such examination should be repeated within six months of entering the preliminary training school, at the end of the first year, and afterwards annually; that full records of these examinations, and of the nurse's weight taken quarterly, should be kept by the physician to the nurses; that no candidate should be accepted for training or taken on the nursing staff unless she has been vaccinated against small-pox, and that immunization against diphtheria—at present obtaining in only about one-quarter of the training schools in the King's Fund area—should be the general rule at the start of training. The committee also commends to the medical and administrative staffs certain suggestions with regard to nurses' diet, accommodation, and hours of duty. They should have three good meals a day besides tea. Each nurse should, if possible, have a room to herself with a floor area of at least 100 square feet. Baths and lavatories should be provided in the ratio of one to five or six nurses. The 96-hour fortnight should be the maximum in all hospitals. The practice of allowing girls under 18 to nurse cases of tuberculosis and other admittedly unsuitable conditions is deprecated, and the committee urges that the tendency in many hospitals to lower the minimum age of entry should be regarded as only a concession to existing circumstances. On the care of a sick nurse the committee mentions that there is complaint in some quarters about difficulties put in the way of nurses "reporting sick," and that there seems to be a general feeling among nurses that it takes a good deal of courage to report sick unless there is a high temperature or some other unmistakable sign or symptom of illness. The committee suggests that it is a short-sighted and mistaken policy not to ensure that even minor ailments receive attention at an early stage. Steps should be taken to encourage nurses to report as soon as they are not well. All nurses taken off duty should receive medical care immediately, and no nurse should be allowed to return to duty until she has been passed as fit by a physician. A sick-bay should be set aside for the nursing staff.

[1] Published by George Barber and Son, Ltd., Furnival Street, E.C.4. (3d.)

MEDICAL SERVICE AND SOCIAL CHANGE: SOME REFLECTIONS AND CONVICTIONS*

BY

Viscount DAWSON OF PENN, P.C., G.C.V.O. M.D., F.R.C.P.

President of the British Medical Association

Members of the Association,—Let me express the deep appreciation I feel at the confidence which you have reposed in me by making me your President at this time of change and stress. For my part, let me say that my sole reason for accepting the honour is the hope that I may be able to make some solid contribution to the solution of the difficult problems which beset equally the public and the profession and which can be solved only by friendly co-operation.

Before moving to business it is meet that I should make reference to the great loss incurred by the death of Sir Beckwith Whitehouse, who was not only a distinguished leader in gynaecology but who gave so freely of himself to the welfare of the profession and the public.

Concerning the subject which is foremost in all our minds, I think I would be serving you best if I were to speak with freedom and detachment, leaving you to do the same, so will you permit me to give utterance to certain reflections and convictions, limited though this must be by the time at my disposal.

The General Picture

I will, with your permission, say a word or two on the general picture, because, after all, medicine does not stand alone: it stands in relation to the whole social organism. An upheaval at once so vast and universal as this war must result in changes in the texture of civilization, and these changes will, for the most part, be those already in seed or in bud and waiting for some impetus to bring them to fruition. Land tenure, planning for town and country homes, industry, social security, health, and education afford examples, and there seems to be a common line of thought running through these projects—namely, that the community as such must, in varying degrees, form a partnership with individual effort so as to give direction and equality of opportunity without blunting the enterprise and zest of the individual to think and strive for the benefit of himself and his kind and thus preserve to personality freedom and scope.

If, in that partnership, the scales are weighted too much in favour of community direction, the result will be regimentation and a deadening uniformity, and if weighted too much in favour of individualism the result will be a haphazard and uncoordinated service. It is the task of statesmanship to find the mean.

I pass to another reflection. The progressive quickening of the social conscience is an outstanding feature of this century, and it has found expression in the humanizing of industry and in a body of social effort without precedent and a body of legislation to improve the health and welfare of the people. But if we pause to inquire whether the achievements of social reform between the last war and this, as judged by the removal of social inequalities and the establishment of social justice, were effective, our answer would have to be in the negative. I need but instance housing, social security, medical services, and education; there has been and there still is a sense of frustration in the community.

A Medical Service for All

To focus on our special concern, is it not a reproach, in view of the way medical knowledge has marched ahead, that a corresponding health and medical service has not been rendered available to all citizens long ere this? In this connexion the pioneer efforts of the medical profession stand forth to its credit, and I am going to stress that historical truth. From 1920 onwards it has, through various agencies, successively and consistently advocated a comprehensive medical service and co-operation between local authorities and voluntary hospitals and agencies. The latest of these efforts is the Medical Planning Commission—a widely representative body.

In contrast, the Ministry of Health, from the death of Sir Robert Morant in 1920 to nearly the outbreak of the present war, has cold-shouldered or opposed any such suggestions. It is only fair, however, to add that those many years of obscurantism have given place at the Ministry for two or three years past to enlightened co-operation, and let me say further that the present Minister, who is greatly interested in this reconstruction, has repeatedly stated that this comprehensive service should be a partnership between the local authorities and the voluntary hospitals, and that in the administration of such a service doctors would play an important part.

Since the Interim Report of the Medical Planning Commission saw the light of day the Beveridge Report on Social Security has come into the picture. Most of us would say that greater security against want is socially just, but the social security scheme postulates Assumption B, which is concerned with a nation-wide comprehensive health service. The inference is that the foundation of such a service is an accepted policy and, incidentally, it has wide and strong popular support.

Misunderstanding and Criticisms

I come to a matter which has troubled me much recently. In recent weeks there has been public misunderstanding because discussion about the form of the service has been interpreted as opposition to its foundation, and this has led to a considerable amount of criticism of the profession, which shows at present little sign of abatement. An illustration has arisen from the motion passed at yesterday's meeting, when by a large majority "a whole-time salaried State Medical Service" was rejected. No fewer than three intelligent people said to me last evening that they were surprised to see that the Representative Meeting had, after all, voted against a "State Medical Service," which is quite a different proposition, for it is impossible to carry out Assumption B without the State having a general direction.

Needless to say, in the shaping and organization of the service, doctors must rightly have a big say; after all, they have to work it; they know the complexities of medical practice, and they, with the public good in the forefront of their minds, and subject to the authority of Parliament, must carry a leading responsibility. Be it remembered that the changes in medical practice to be wrought are deep and fundamental and will affect all members of the profession; no other nation, comparably placed, has undertaken so big an endeavour. Is it not obvious, therefore, that this service must be built up in stages, in accord with the Prime Minister's Five-year Plan? Foundations first. If you will permit me I will now pass to consider one of those foundations.

Any service needs administrative direction. The British Medical Association is an example. If properly designed, that direction will not interfere with our freedom, and the Minister has promised that the profession shall have a large share in such administration. What, then, is the best form of local administrative body for this service? That, after all, is the prerequisite to any action of any kind and has to be settled first. Should that local administrative body be the major local authorities, *or* a joint board embracing several major local authorities with vocational advisory bodies attached—and this latter is an essential condition—*or* should there be large areas specially delineated for health purposes, each administered by a widely representative Health Council? The last idea is, to my mind, the most far-sighted and attractive proposition. Both for the public and for the doctors it offers the best prospect of future development.

I hope the Government will give it favourable consideration; but we must remember this—that the Minister of Health is between the upper and the nether stones. On the one hand he has to pay attention to the medical profession and wishes to do so, but, on the other, he has to carry along with him the local authorities. It may be that local authorities would not be too eager to agree to the larger plans which I personally would favour—namely, "health provinces" administered by a representative Health Council.

* A brief address on his election to the Presidency of the Association at the Annual General Meeting on September 22, 1943.

A Comprehensive Service

I pass to my next point. In the light of Assumption B the Beveridge report leaves to the medical profession and the community the devisal of the comprehensive service. The social security payment for sickness is only a maintenance payment, and the Beveridge report favours voluntary insurance to be "jam" for the "bread." Here contributory schemes would provide amenities according to the taste of the patient. Supposing a grocer who by his industry has become a successful man wants to provide his sick wife with the comforts of a room in a pay-block, is he to be denied that privilege? The service of medicine needs to be infinitely flexible. Man sick is individualistic, and let us beware of the doctrinaires who think in terms of tyrannical uniformity—one of the faults of the Nazi creed. We want the same essential service for all—namely, the best—but no dull uniformity with it. A comprehensive service, free to all citizens, does not necessarily involve a whole-time salaried service for all doctors, nor is it incompatible necessarily—I am not saying desirably—with private practice and pay-blocks. Although, in my belief, more earnings in the future will be derived from salary and less from fees, I am far from convinced that any uniform system of service or payment will meet conditions so multifarious as those attaching to medical practice, and any emergence of official and non-official groups of doctors would, in my opinion, be disastrous.

We must recall that one of the evil consequences of the Ministry of Health not accepting the advice of the leaders of the profession in 1929 was that they thereby instituted in any one town two sets of hospitals and two groups of doctors. If they had then accepted advice and instituted machinery for progressive co-ordination of local government and voluntary services we should be much nearer our goal to-day.

Fortunately, we now have at the Ministry of Health a different order; it is co-operative and anxious to work with the profession. Payment by salary, by fee, by capitation grant, separately or in combination—these admittedly thorny questions can find their solution only in the light of experience.

In conclusion, any satisfactory scheme for a comprehensive medical service can be built up only in stages: foundations first and soon, superstructure later and gradually in the light of accrued experience. Such experience could be obtained by different "try-outs" in different regions during an experimental period, and that applies, for instance, to health centres. Customs, habits, feelings, many of them centuries old, must not be suddenly uprooted; rather must the new order be gradually grafted on to medicine's historic past. Such is our English way. So following, not otherwise, when its reorientation reaches its completion, medicine will have become greater in its comprehension, and will offer to its disciples a life of fullness and content and to the people a steadily enlarging prospect of health and welfare.

Reports of Societies

LABORATORY CONTROL OF ENTERIC FEVERS

At a meeting of the Fever Hospital Medical Service Group of the Society of Medical Officers of Health, with Dr. ANDREW TOPPING in the chair, Dr. A. FELIX opened a discussion on recent advances in the laboratory control of typhoid and paratyphoid fevers with an account of the theory and practice of typing typhoid and paratyphoid B bacilli by Vi bacteriophage and the Vi agglutination tests in the detection of chronic carriers. He said Craigie and Yen (1938) found that strains of the typhoid bacillus could be divided into a number of types on the basis of their sensitiveness to specifically adapted anti-Vi bacteriophages. The results of the typing by this method were as reliable and significant as those obtained in streptococcal or pneumococcal infections with the old-established serological tests. More recently Felix and Callow (1943) found that the bacteriophage technique could be applied also to strains of the paratyphoid B bacillus. Anti-Vi phages of *Bact. paratyphosum* B could be adapted to develop a high degree of specificity for particular strains, whereas anti-O phages were incapable of such adaptation. So far four different Vi-phage types of *Bact. paratyphosum* B had been identified, and more than 90% of the strains isolated from patients and carriers in Great Britain during the past three years were found to belong to those four types. This new typing method was an indispensable laboratory aid to the investigation of sporadic cases or outbreaks of typhoid and paratyphoid B fever. The detection of a chronic carrier was usually a difficult task, though the methods of isolating typhoid and paratyphoid bacilli had been greatly improved through the introduction of refined culture media. In all the recent outbreaks of paratyphoid B fever in this country the individuals responsible for spreading the infection were temporary excretors. The true culprits—namely, the chronic carriers—escaped detection. The Vi agglutination test, which originally applied to typhoid alone, had now been extended to paratyphoid B fever. Dr. Felix gave tables showing how this test could be used to help detect chronic carriers among recovered patients, who otherwise might be discharged from hospital because they excreted bacilli intermittently. A decreasing Vi titre would indicate temporary excretion, and a steady or rising Vi titre a possible chronic carrier state.

Application in Field Studies

Dr. W. H. BRADLEY said that since Budd of Bristol recognized typhoid as an alimentary infection in the middle of the 19th century enteric fever had been split up into a number of groups: first, by the identification of the typhoid bacillus by Eberth in 1880, and then by the recognition at the turn of the century of the para-organisms and the other salmonellas. Now, by the application of the power of certain bacteriophages to lyse the organisms of typhoid and paratyphoid, it was possible further to classify them into a number of "phage types." Illustrating the use of this in epidemiologcal field studies, Dr. Bradley said that a number of cases of typhoid which appeared in a cathedral town in the South-West would have defied investigation had it not been found that they belonged to three different phage types; when studied they proved to originate in three separate sources of infection operating simultaneously. It was possible to trace these sources to separate foci outside the city. More recently, fourteen cases of typhoid occurred in an extra-metropolitan borough using its own water supply, which naturally was suspected because an alternative common aliment could not be identified. The appearance of two cases of the same type in persons in a neighbouring locality who had not drunk the water helped to remove the suspicion. Dr. Bradley said it was usual for single cases, apparently sporadic, to occur in a London borough from time to time. For example, although there were only about 50 cases of typhoid notified in London in 1942 they occurred in 22 of the 28 boroughs. It was rarely possible to trace the source of infection or to relate cases in different boroughs. Since the beginning of 1943 they had applied phage typing to this problem. Up to June cases of typhoid had appeared in ten boroughs; the majority had been related to three foci of infection; of the remainder two cases were imported, another arose in a mental hospital, and one only had proved resistant to investigation. He agreed with Dr. Felix that with careful and persistent epidemiological inquiry and specialized bacteriology it should now be possible to account for almost every case, and in time to eradicate completely the enteric fevers. Certain changes in current practice were, however, necessary. Previously the objective had been to obtain sufficient negative cultures to clear the patient; now blood, stool, and urine cultures were made repeatedly until the organism was recovered and typed. The organism from every sporadic case and from a sample of the cases in any outbreak should be typed. The date of onset should also be determined as accurately as possible and the medical officer of health who was investigating the source of the disease should be informed of this and the type of organism. There was some clinical evidence that organisms of different types differed also in virulence, and to some extent typing might be of value in prognosis. Vi determinations were useful in detecting carriers. As a preliminary screen for a carrier in a food-handling establishment, for instance, the Felix Vi test simplified investigation; taken in conjunction with the evidence obtained from circumstantial inquiry this screen made much of the stool and urine cultures unnecessary, and, what was more important, gave a prompt and more dependable answer.

Discussion

Dr. R. CRUICKSHANK thought that the crux of the situation was the chronic typhoid carrier. Recovery of typhoid and paratyphoid organisms, either in the acute stage of the disease or in convalescence, demanded selective media. This was true over the whole range of bowel infections. For example, their use had demonstrated that convalescent carriers occurred after salmonella infections—a thing never suspected in the past when MacConkey's medium was employed. Dr. A. L. K. RANKIN, describing the clinical features in the small borough outbreak mentioned by Dr. Bradley, said that in the adult cases the onset had been gradual, but two children had gastro-intestinal symptoms. A characteristic of all cases was their mildness. During the stage of advance the temperature had shown morning remissions which he regarded as a good prognostic sign. Leucopenia was present in all cases. The diazo test was consistently negative, but no case was admitted before the 14th day of disease. One woman developed the uncommon complication of mastitis. Col. G. W. M. FINDLAY asked whether it would be possible to treat typhoid by phage given intravenously. Dramatic results had been claimed in India from the combined use of phage and typhoid antitoxin to deal with lysed products. In experiments on mice he had found it necessary to give phage very early to obtain a therapeutic effect.

Dr. BRADLEY, in reply, said that gastro-intestinal symptoms at the time of ingestion of typhoid bacilli were common: they had been encountered in both the Croydon water-borne and the Bournemouth milk-borne outbreaks. Intestinal symptoms consisting of the passage of blood and mucus were usual to begin with; vomiting came later. The whole upset was usually over in 48 hours. He described a hotel outbreak in which 36 guests had gastro-intestinal symptoms within 48 hours of arrival and 17 subsequently developed typhoid. Dr. FELIX suggested that the gastro-intestinal symptoms were not necessarily due to typhoid or paratyphoid organisms. They might indicate only that the vehicle was heavily contaminated with other organisms, including preformed toxins. He agreed with Col. Findlay that in the phage treatment of experimentally infected mice the results were good in typhoid, whereas no effect could be seen in *aertrycke* infections. This was probably due to the fact that typhoid was not a usual infecting organism in mice, whereas *aertrycke* was. He had used phage in large intravenous doses in the treatment of chronic typhoid carriers, but the experiment was a complete failure. Yet the same phages had been tested in broth and up to 50% ox bile, where they produced complete sterilization. He thought that phage treatment might be tried on carriers of shorter duration where there was less heavy damage at the local focus of infection.

Correspondence

Urea and Water Metabolism

SIR,—I was much interested in Dr. J. A. Brown's article on urea for migraine (Aug. 14, p. 201), though from a different angle. Since the war I have been greatly struck by the number of girls, both in the Services and out, who come complaining of increasing weight, which has proved entirely refractory to thyroid. In one such case 20 gr. of desiccated thyroid had been taken daily, and on stopping this she only increased 2 lb. a month, so it was clearly contraindicated.

Naturally, one may attribute a good deal of this to the large starch content of war diet; active life makes them sufficiently hungry to eat much of the only food which is plentiful. But in a good many cases the weight has either increased so rapidly or has fluctuated so widely that it seemed to me there must be a disturbed water balance, presumably due to the pituitary, since they nearly all showed the limb-girdle type of obesity. I therefore prescribed mersalyl or aminophylline with restriction of salt intake, but with only varying success.

Dr. Brown refers to the observation of Goldzieher that in migraine there may be retention of 73% of a test amount of salt, together with water retention. It therefore occurred to me that the present low protein diet deprives the body of some of the normal diuretic, urea, since the greater part of this comes directly from the breakdown of protein; and according to the above observations retention of salt and water would follow. I am therefore trying now the effect of urea administration in these cases; it is, of course, too soon to speak of results, but there seems a rational basis for this treatment.

My interest in the subject was increased by the paper by Drs. Beaumont and Robertson (*Journal*, Sept. 18, p. 356) in which they describe a syndrome of "pituitary hypothyroidism" in which, nevertheless, the patient was thin to a degree resembling Simmonds's disease. Here the urea clearance and water elimination were reduced. Sodium chloride, among other things, was given freely, and the patient improved. It will be interesting to see whether a disturbance of salt elimination has a definite effect on increasing or decreasing weight.

One other point, incidentally. Years ago Sir Robert Hutchison made the sage remark that protein is one of those things of which we must have too much in order to have enough. The tissues select those amino-acids most suitable for their needs from the welter of them resulting from tryptic digestion, so that a wide choice is advantageous, while the rejected fragments are excreted as urea. May it not be that the widespread complaints of muscular fatigue and twitchings are due to the prolonged restriction of choice for muscular repair having a cumulative effect? The effect of a prolonged Chittenden diet is well known. My personal experience during a recent visit to Eire for academic reasons was that although I was working hard an ample meat diet corresponded to a notable diminution of muscular fatigue.—I am, etc.,

Cambridge. W. LANGDON-BROWN.

Inadequate Hospital Diets

SIR,—Your leading article (Sept. 18, p. 365) is most disquieting. It is scandalous to find in a London general hospital that: (1) the average daily intake of vitamin C was 3 mg.; (2) the nurses were not getting enough to eat and their diets were deficient in vitamins A and C. It is lamentable that improper feeding in hospitals is still being perpetuated. I can recall while a resident in a London general hospital in the late 'twenties being given margarine (non-vitaminized), meat so tough and fish so putrid that we hurled them down the hatch to the kitchen below. The patients' food was fit only for the pig-swill. The official reply to our complaints was that if the residents were better fed then the nurses' diet would have to be improved, with concomitant increase in the cost of hospital maintenance. It is relevant that in Sir Robert Hutchison's own hospital the residents' mess was the envy of all others. You say, Sir, that the hospital kitchen is at least as important as the hospital dispensary. I would up-grade the kitchen staff in status and salary to that of the operating theatre. Why are the numskulls put in the cookhouse? The Minister of Health is alive to the situation, and one hopes that all hospitals will implement forthwith the valuable advice given in the brochure *War-Time Feeding in Hospitals*.

Again you are right when you plead for the hospital dietitian being in full control of the kitchen. She must be on top and not on tap, and the steward should be subservient to her. When will medical and lay committees appreciate that proper feeding of *all* within the confines of the hospital makes for quicker convalescence, better service, and a happy and healthy community?—I am, etc.,

London, W.1. W. C. W. NIXON.

Transfusion and Overloading the Circulation

SIR,—The very interesting paper by Dr. R. Drummond on the dangers of circulatory overloading (Sept. 11, p. 319) emphasizes the fact that on occasions over-treatment can be more lethal than no treatment at all. The efforts to save life by blood transfusion will achieve their greatest success only when the clinician in charge of a case can recognize the earliest warnings that the heart is being asked to do more than is within its power. Dr. Drummond quotes Sharpey-Schafer in support of his statement that the earliest sign of overloading is pulmonary oedema, as shown at first by the onset of crepitations. No mention is made of the importance of the pulse rate as a clinical guide. In my opinion it is the most valuable index of danger, and I am sure other observers can confirm my experience in this respect.

Patients in whom haemorrhage is associated with toxaemia, as in severe concealed accidental haemorrhage, well illustrate

the type of case to which Dr. Drummond referred as being particularly liable to react adversely to circulatory overloading. For some years it has been my practice in transfusing these and similar patients to keep an almost continuous observation of the pulse rate, and to record it every few minutes on a chart at the bedside. As the patient improves the rate falls and the volume increases. When in spite of an apparent improvement in the general condition of the patient the pulse rate commences to rise again, the transfusion is slowed or stopped, and within a few minutes the rate again falls. I have been able to demonstrate dramatic responses of this type on several occasions when transfusing desperately ill women. I do not know as yet whether alteration in the pulse rate is an earlier sign than the onset of crepitations, although I believe it may be, but I am certain it is a more important clinical sign in that it is so easily elicited without disturbing a gravely ill patient in whom crepitations may well have been present before the transfusion was commenced.—I am, etc.,

Oxford. JOHN STALLWORTHY.

Arterial Embolism and Crush Syndrome

SIR,—Uraemia following arterial embolism as described by your correspondent Dr. Guthkelch (Aug. 21, p. 245) is not commonly recognized, and its mechanism is unknown. I have recently had a case of spontaneous femoral arterial thrombosis in which uraemia developed: myohaemoglobin was excreted in the urine, and the muscles at necropsy were blanched, resembling those of the crush syndrome. It would be extremely interesting if such cases could be investigated with this specifically in mind; whether a mild degree of uraemia is of frequent occurrence or a rare complication of embolism or thrombosis remains to be seen.—I am, etc.,

London, W.12. E. G. L. BYWATERS.

Treatment of Septic Hands and Fingers

SIR,—At this phase of the war, when every man-power hour is precious, it might well repay the Ministries of Health and Labour to circularize every doctor in the country with a short and concise bulletin on the treatment of septic processes of the hands and fingers. It is a matter of common observation that there is much unskilful and even negligent treatment of "septic fingers." The cost to the country in reduced production, sick benefit, and compensation must amount to hundreds of thousands of pounds every year. This, serious enough in peacetime, may prove a menace just now.

The greatest need is to revise our methods as they affect the students. In many of the teaching hospitals the most junior house-surgeons and students are in almost sole charge of the septic cases save for the nominal supervision of one of the surgeons. The latter will often only see these cases when they become so bad that admission is necessary. The supervision of the ripening stage is in the hands of the least experienced of the hospital staff. When incision is indicated the same functionary or, at his discretion, one of the senior dressers, performs the operation under nitrous oxide administered by the most junior anaesthetist or his student deputy. The results of this surgical team work can be seen in large numbers every day in out-patient departments, where the patients attend for hot soaks, probing, and re-incision.

The newly qualified doctor starts in a house job or, worse still, in general practice with some fixed and some confused ideas on the subject. The fixed ideas are based on his personal observations and generally include the following: (1) Septic fingers are the prerogative of the inexperienced surgeon and are seldom taken seriously except by the patient. (2) Septic fingers provide the embryo anaesthetist with excellent and varied material for short administrations of nitrous oxide with, or more often without, oxygen. The absence of the latter may be very noticeable. (3) Septic fingers are invariably chronic cases and too much improvement must not be expected at once. (4) The after-care involves hypertonic soaks, radiant heat, probing for sequestra, and much reflection and often regret that the initial incision was so small. (5) That someone called Kanavel has written a book on septic fingers which is generally acknowledged as the last word on the subject. Owing to its special nature, however, it seldom attracts the senior students, who are already overburdened with the more important issues of the after-treatment of gastrectomies and lobectomies, in which the examiners are more interested and on which the lecturers are more expansive.

The confused ideas concern the position and boundaries of the thenar space, the peculiar routes of the tendon sheaths, and the multiplicity of most excellent incisions. On this type of experience the newly qualified doctor bases the treatment of his septic cases in his general practice. Poulticing and the ripening process are all too often over-prolonged, osteitis develops, and stiffness follows. Because of hurry, incisions are too small and strategically badly placed. It is a defect in our legislation that to cut a septic finger under local ethyl chloride "anaesthesia" is not yet a criminal offence, and it is to be deplored that there are still qualified registered practitioners who attempt to do it.

Much of this could be corrected by giving prominence to really sound methods, such as are employed by some clinics. The methods of the Birmingham Accident Hospital (at which I recently spent an instructive stay) seem ideal: The septic hand or finger is immobilized on a P.O.P. splint until it improves, as a great many do, or until incision is indicated. When the latter is necessary the patient is admitted. Morphine and scopolamine are given 1½ hours before operation. The anaesthetic is pentothal, nitrous oxide, oxygen, and, if more is wanted, trilene. The operation is in a large theatre and performed by a surgeon of experience. Full aseptic ritual, as for a major abdominal, is observed. Operation is carried out in a bloodless field, secured by the routine application of a sphygmomanometer. The surgeon's need, not the volatility of the anaesthetic, determines the duration of the operation. The same care is given to a septic finger as would be given to a compound fracture of tibia and fibula. Finally, the incision is very lightly packed with vaseline gauze and the limb again immobilized in P.O.P. Hot fomentations are not used, and dressings are infrequent. Rehabilitation is started at the earliest moment, and after-care is not less than care at operation.

No doubt in the future penicillin will banish the bogy of the septic finger, but in the meantime it remains as a great menace to industrial efficiency, and correct treatment by sound surgery and skilful after-care will only become standardized by propaganda on a big scale. It cannot be over-emphasized that a septic finger can be just as incapacitating as a fractured humerus or even femur, and cause nearly as much incapacity and loss of working time.

—I am, etc.,

St. Ives. E. C. ATKINSON.

Treatment of Lupus Vulgaris

SIR,—I think the annotation headed "Treatment of Lupus Vulgaris" (Sept. 18, p. 366) calls for a few comments. In the first place the Finsen and Finsen Reyn lamps have been abolished as obsolete from the London Hospital since February, 1938. The old Finsen lamp needed the attention of one nurse per lamp, and treatment of each individual spot took, roughly speaking, one hour. Now the Finsen-Lomholt lamp is in use; three lamps can be managed by one nurse at a time, and commonly three treatments can be given in the hour on each lamp—a considerable saving. It is true that well-equipped and experienced centres must be maintained for the treatment of lupus vulgaris. Some provision also should be made for dealing with very advanced cases at suitable institutions, but the average case can well be treated at a lupus centre provided sleeping accommodation under suitable conditions is available at a reasonable distance from the centre. Such an arrangement should permit the patient in the majority of cases to continue work during the long treatment, to his own and the national advantage.—I am, etc.,

ARTHUR BURROWS,
Hon. Physician (with care of Out-patients) to Skin and Light Department, London Hospital.

Issue of Radon

SIR,—The National Radium Commission and the Medical Research Council decided in January, 1943, that the following conditions should govern the issue of radon prepared from radium under their control. The same principles have been accepted by the London Hospital Radon Service and that of the Manchester Radium Institute.

1. It is the intention of the Radon Centres to supply radon only to hospitals which have been approved by the Radium Commission. Radon will not henceforth be supplied direct to individual clinicians.

2. The Radium Commission will in the first instance approve for supplies of radon only those hospitals which have a properly equipped radiotherapeutic department, with a radiotherapist and a physicist as part of the staff, and which have a properly organized follow-up of patients treated by radiotherapy. Such hospitals must undertake responsibility for seeing that the radon is properly used, with adequate precautions against wrong dosage.

3. Where members of the staff of an approved hospital carry out some of their work at other hospitals not able to comply with Condition 2 (above), they may obtain supplies of radon through the approved hospital provided that the radiotherapist of the approved hospital is satisfied that the radon is to be used under such conditions as will provide for efficiency.

Under these conditions the following hospitals have been approved to date—Sept., 1943:

Aberdeen Royal Infirmary
Birmingham United Hospital
Bournemouth, Royal Victoria and West Hants Hospital
Bradford Royal Infirmary
Bristol Royal Hospital
Burnley Victoria Hospital
Cambridge, Addenbrooke's Hospital
Cardiff Royal Infirmary
Charing Cross Hospital
Edinburgh Royal Infirmary
Glasgow Royal Cancer Hospital
Glasgow Royal Infirmary
Glasgow Western Infirmary
Guy's Hospital
Hull Royal Infirmary
King's College Hospital
Lambeth and Hammersmith Hospitals, L.C.C.
Leeds General Infirmary
Leicester Royal Infirmary
Lincoln County Hospital and Scunthorpe Hospital
Liverpool Radium Institute
Liverpool Royal Infirmary
London Hospital
Manchester Royal Infirmary and Holt Radium Institute
Marie Curie Hospital
Middlesex Hospital
Mount Vernon Hospital and Radium Institute, Northwood
Newcastle, Royal Victoria Infirmary
Newport, Royal Gwent Hospital
Northampton General Hospital
Norwich, Norfolk and Norwich Hospital
Oxford, Radcliffe Infirmary
Plymouth, Prince of Wales's Hospital
Rochester, St. Bartholomew's Hospital
Royal Cancer Hospital (Free)
Royal Free Hospital
Royal Northern Hospital
St. Bartholomew's Hospital
St. George's Hospital
St. Mary's Hospital
St. Thomas's Hospital
Sheffield Radium Centre
Southampton, Royal South Hants Hospital
Stoke-on-Trent, North Staffordshire Royal Infirmary
Swansea General Hospital
Tunbridge Wells, Kent and Sussex Hospital
University College Hospital
Westminster Hospital
Wolverhampton Royal Hospital

—I am, etc.,

GEORGE F. STEBBING,
Hon. Secretary, National Radium Commission.

Care of the Child's Eyesight

SIR,—The large sum which is to be devoted to research in ophthalmology at Oxford and to the prevention and treatment of eye diseases has caused much gratification and should bring great benefit to the public. In the meantime much could be done in the prevention of eye troubles at a very small expense. It has always seemed strange to me that, while children attending council schools have their eyes examined at regular intervals, there appears to be no routine examination of the eyes in public, preparatory, or private day schools, except in a very few instances. It would be simple for the visual acuity of these children to be checked twice a year; this could be done by one of the staff of the school with the aid of a Snellen eye chart, and no expert knowledge is required. Any child who did not come up to the normal standard could then be referred to an ophthalmic surgeon, and much valuable time would be saved. Under present conditions, if a child complains that he cannot see the blackboard, the master, instead of sending him straightway to an ophthalmic surgeon, usually tells him to go and sit in a desk in the front of the class, where the child is quite happy for another 12 months while the myopia steadily increases. Myopia usually comes on between the ages of 11 and 15 in those in whom there is a family tendency, and unless the child is examined twice yearly it is quite often unsuspected until the condition is fairly advanced.

I think the following three suggestions would do much for the eyesight of our future citizens: (1) That the visual acuity of all school children should be checked twice a year. (2) That they should work only in well-lighted class-rooms in desks suitable to their size so that they are always in the correct posture. (3) That no child should be allowed to read in bed except in the case of illness, when great care and attention should be given to the lighting.—I am, etc.,

Camberley. LESLIE HARTLEY.

Health and Tonsillectomy

SIR,—In your annotation entitled "Health and Tonsillectomy" (Sept. 11, p. 334) you sum up by saying: "This study supplies additional evidence to support the view that a large proportion of the tonsil and adenoid operations in children are unnecessary." The "view" may or may not be correct, but I cannot find any support for it in the "study."

The compiler of the first series of statistics quoted by you states that "the tonsillectomized group had no advantage over the group who were not operated on," and most of the others give expression to the same idea. But why should one expect to find any advantage? Why should any person who has undergone any operation have an "advantage" over another who has not required it?

Consider a single case. Johnny has had his tonsils removed and Tommy has not. In assessing the value of the operation we do not ask whether Johnny enjoys better health than Tommy or has any advantage over him. We ask whether he enjoys better health after the operation than he did before. Almost invariably the parents say that he does. I think that that is the only criterion by which the operation should be judged. The multiplication of the case by 100 or 100,000 does not make any difference to the validity of the argument. The only series of statistics in your list that has any real bearing on the question is that of the 364 boys whose sickness incidence had been studied both before and after operation, and in that series it is admitted that the operation was justified.—I am, etc.,

London, S.E.25. ALEX ROSE.

Action of Pentose Nucleotides

SIR,—In the article on stimulation of leucopoiesis (Sept. 18, p. 365) there is the statement that pentose nucleotides "act mainly by redistribution and mobilization of preformed leucocytes." It would be valuable if the evidence for this statement could be published. My own experience does not support the contention. I find that, after starting treatment with pentose nucleotides, there is always a period during which no blood changes develop, however large the doses given. This period is about 4 days; and after its expiry there are immature granulocytes in the peripheral blood—a change that cannot be due to redistribution of cells already present in the circulation. In cases in which the treatment fails there are no such blood changes, and any explanation, other than that of new formation of cells in the marrow, must take these facts into account.—I am, etc.,

London, W.1. A. PINEY.

Arsenic for Vincent's Infection

SIR,—I beg to disagree with Squad. Ldr. E. C. O. Jewesbury's statement in his article (Sept. 18, p. 360) that the employment of intravenous arsenical compounds for Vincent's infection is useless and wasteful.

As medical officer in the V.D. clinic attached to this hospital I have not infrequently seen cases of Vincent's gingivitis or stomatitis develop during arsenical therapy, although I cannot recall a case of faucial ulceration occurring under these circumstances. In most cases bismuth has also been employed, and may by irritating the gums be a precipitating factor in the onset of a Vincent's infection.

In my work in the fever wards of this hospital I again encounter Vincent's infection—cases admitted for diagnosis of diphtheria, or for treatment because of the severity of the condition. As I see all cases outside before admission, trivial or mild cases are not admitted. In those cases of acute faucial angina due to Vincent's organisms I have no doubt as to the efficacy of the intravenous administration of arsenic, as either N.A.B. or mapharside. Pain, fever, and malaise rapidly subside in the great majority of cases, and the local throat condition clears rapidly. I can recall only once having to give more than one injection. The gingivitis which often accompanies the faucial condition does not respond so well, and usually requires local treatment.—I am, etc.,

A. B. CHRISTIE,
Isolation Hospital, Southend-on-Sea. Medical Superintendent.

The Common Cold

SIR,—The following facts may be of interest to either sufferers from or investigators of the common cold. During the course of twenty-five years' practice of psycho-analysis for the treatment of psychoneurotics I have observed that in them: (1) A cold invariably occurred in a particular emotional state. (2) The occurrence of a cold could be prognosticated whenever this state developed. (3) The cold could be aborted if a different emotional state could be produced in the course of treatment, or could be shortened if it had started. (4) Cold, wet, hunger, exhaustion, and a source of infection do not result in the development of a cold in the absence of the appropriate

emotional state. (5) Cold "proneness" disappears completely as a result of successful treatment, and does not recur.

Though these observations have little immediate practical value, my experience demonstrates to me at least that the solution of the problem of the common cold lies in the sphere of preventive psychological medicine. The specific factor is psychological; the microbic one secondary.—I am, etc.,

E. Wrigley Braithwaite,
Consulting Psychiatrist, Ministry of Health.

Sterility and Contraception

Sir,—In your issue of Sept. 11 (p. 350) Dr. Gibbon Fitzgibbon of Dublin questions the accuracy of the statement that contraception in nulliparous women is liable to cause sterility, and asks for further evidence of this. His request would seem most opportune, for there appears to be considerable loose thinking upon this subject. Very few authorities are teaching that contraceptive practice and sterility are related, but, should this tenet be true, it is clearly most necessary that the whole medical profession should recognize this fact and teach accordingly. For this reason a full discussion should be welcome.

Dr. Fitzgibbon finds that "the vast majority of causes of primary sterility are conditions which pre-existed marriage." Informed opinion would surely anticipate this conclusion. Mazer and Israel (*Menstrual Disorders and Sterility*, Heinemann) find that non-patency of the Fallopian tubes and faults in the seminal fluid are the two commonest single factors in the barren marriage. By no stretch of imagination could contraceptive practices bear upon these.

Doctrines which coincide with people's deepest superstitions, however unfounded, are always difficult to eradicate. From time immemorial the infertile woman has tacitly accepted her barrenness as a stigma and a punishment. It is a great responsibility, therefore, to play upon fears of this nature. The point is not merely academic. When the late Sir Francis Fremantle announced in Parliament that this alleged danger of contraception must be "preached from the house-tops" he must have brought grave anxiety to countless young married women, and may have caused many to renounce their Service jobs, or munition work, in favour of immediate pregnancy. If such teaching is *true*, only good can result. But at a time when the mysteries of sterility are beginning to be understood, surely the medical profession must shoulder the responsibility of agreeing upon such matters and giving concerted guidance upon them to the public.—I am, etc.,

London. Joan Malleson.

Artificial Insemination

Sir,—I was interested in Dr. Mary Barton's letter (Sept. 4, p. 312), and while I do not wish to deprecate the value of scientific work on this subject, I feel that the procedure which she suggests where the husband has been proved the sterile partner—namely, the insemination of the wife with donated semen—is likely to worsen rather than improve the marital relationship, and is also handicapping unfairly the child born in this way. I shall deal with the psychological effects in each partner and on the child in turn, as I see them.

First, the mother. She is given the satisfaction of bearing her own child. Is Dr. Barton sure that this joy is sufficiently lasting and sufficiently embracing to give complete satisfaction to the mother, knowing that her husband was not the father? Was the donor carefully selected as resembling the sterile husband in appearance, or in character, temperament, and all these traits which attract a woman to a particular man? Have we any guarantee that the secret of the child's birth will be for ever concealed within the breast of husband and wife? Will the woman's love not tend to fix itself on the child and withdraw more and more from her husband, in spite of his generosity? Does the fact that she agrees to such a procedure not suggest that a child-fixation of her love and affection is almost inevitable?

Secondly, the husband, whom Dr. Barton seems to have left out of her calculations. She speaks of the "generosity" of the husband in giving his consent. I should rather use the expression "generous impulse," and I should fear that such an impulse in times of anxiety and trial would be perhaps bitterly regretted. I can see the sterile husband drifting away from his wife rather than being drawn closer to her by such a solution of their problem.

Thirdly, the child. Such a child would, in my opinion, be extremely prone to develop an Oedipus or mother-fixation complex.

To sum up. I am convinced that such a procedure would lead to a constant struggle, obvious or repressed, between the child and the husband for the woman's love and affection. The effect of such emotional conflict seems to me fraught with danger both to the marital relationship of husband and wife and to that atmosphere of security and happiness in the home which is so essential to the development of a child's personality.

On the other hand, I feel that the couple who adopt a child by mutual consent, after the necessary investigation to make sure that the husband is permanently sterile, have a much better chance of achieving mutual happiness, and that the woman's maternal instinct can be satisfied, sublimated perhaps if you like, by the nurture and care of such a child, in a fashion more lasting than the thrill of the physical act of motherhood.—I am, etc.,

Falkirk, Stirlingshire. Alex. Leitch.

Sir,—May I add to Dr. Barton's plea that careful consideration be given to and greater use be made of artificial insemination. Among its indications are: (1) impotence—more especially for the persistent case of premature ejaculation without penetration; (2) low counts containing some actively motile normally shaped sperms; (3) when the operation of epididymo-vasostomy is not desired or has proved unsuccessful in cases of double epididymal block. Here needle puncture can often obtain 0.2 or 0.3 c.cm. of fluid containing active spermatozoa. By replacing the puncture needle with a blunt Labat this amount can be inseminated without loss, giving the only possible chance of a family. In all these instances the husband's semen is utilized, and there can surely be no objection.

Selected donor semen, frequently that of the recipient's brother-in-law, at the request of and with the agreement of husband and wife, is more widely used in the U.S.A., where it has found much favour. In most cases it has prevented and not caused the drifting apart of two people, and has provided a child far more an integral member of the family than any adopted child would have been, and also satisfied a woman's yearning to have a child of her own.—I am, etc.,

London, W.C.1. Reynold H. Boyd.

Sir,—To-day great interest is being taken in artificial insemination for married women. As yet I have not seen a discussion on its possibilities for unmarried women. Many of the latter do desire children and would be happier, and far less likely to develop into embittered spinsters, by realizing this ambition. The Church would surely be unable to frown on such a practice, as immorality is not involved. I think that the Government should give consideration to this question. Such offspring under present conditions would, I suppose, be regarded as illegitimate.—I am, etc.,

London, W.9. Anne Ethel McCandless, M.B., Ch.B.

Penicillin

Sir,—Your interesting leading article on penicillin (Aug. 28, p. 269) contains the sentence: "The search for something else as good as penicillin but perhaps more easily produced has therefore failed, as have efforts to synthesize it." This statement is less than just to many first-class organic chemists at present engaged on attacking a problem essentially antecedent to that of synthesis.

Even though to the admiring medical practitioner the organic chemist may seem a wizard, he is not capable of attempting the synthesis of a compound until he knows its constitution. He cannot know the constitution of any compound until he has separated it in substantially pure form. Crystalline salts of penicillin, it is reported, have only just been obtained for the first time, and even these may well be less than 100% "pure." Hence characterization of pure penicillin has so far been out of the question. How much more so any attempt at synthesis! To say, therefore, that efforts to synthesize it have failed is not fair comment. To state, on the other hand, that its isolation in pure form has so far not yet been achieved is correct, and is undoubtedly due to the extraordinary chemical properties of this extraordinary product of an extraordinary organism.—I am, etc.,

Greenford, Middlesex. A. L. Bacharach.

Mosquitoes and Static Water Tanks

SIR,—Your observations (Sept. 11, p. 332) on a potential danger of the static water tanks becoming the birth-places of mosquitoes, especially of *Anopheles maculipennis*, are timely. Many years ago, when I was medical officer of health of Lahore (Punjab) (larger than Portsmouth and consisting of an interesting but very congested native city, a well-laid-out civil station, and certain villages in the outskirts of its boundaries), I made some investigations into the utility of certain small fishes as natural enemies to the larvae. I read a paper on the subject, as a delegate from the Punjab Government, at the All-India Sanitary Conference at Simla, and I took with me bowls of three species of fishes and larvae of *Culex* and *Anopheles* to show how voracious these fishes were in destroying the larvae, especially a beautiful specimen with golden bands on each side. The size of these fishes varies from one to one and a half inches. There must surely be in each country some species of fish which are natural enemies to these larvae. The best antimalarial measure would be the breeding of such species for this use. Oil has its limitations and is impracticable in some areas, and at present it cannot be used on a large scale.

The mosquito is mainly a nocturnal biting insect, and all through its life history shade plays an important part. The female by instinct seeks dark places to lay its eggs; so we find that inlets of the banks of streams with overhanging grass, reeds, shrubs, or trees are common breeding grounds. Thus it is not the size of the tanks which is a factor in the choice of a breeding place, but rather the position in which the tank is placed so that the water in it may be darkened by shade as by branches of trees above or by the side or sides of a building. Again, anything like leaves or algae will give a certain amount of shade and hiding place for larvae. I think it will be found that tanks out in the open, away from trees, hedges, or buildings, will not breed any mosquitoes. In my opinion, no static water tanks should be placed in a shade. If they cannot be removed the best plan would be to cover them with sections of well-fitting thin boarding, which can be rapidly removed when required. This will save nuisance, possible sickness, oil, time, and man-power. As oil acts mechanically by preventing air entering the breathing tubes of larvae it should not be impossible to find a chemical which would act as a larvicide. Where the eucalyptus tree grows no mosquitoes exist for long distances from them, and a few drops of eucalyptus oil on the pillow or handkerchief near by is a not unpleasant protection against mosquito bites.—I am, etc.,

Southsea. A. G. NEWELL.

Pasteurization of Milk

SIR,—In recent discussions on pasteurized milk the following facts appear to have been overlooked. It is generally agreed that living tubercle bacilli in raw milk from tuberculous cows are responsible for a large proportion of cases of (*a*) intestinal and peritoneal tuberculosis, (*b*) spinal tuberculosis, (*c*) tuberculosis of other bones and joints, and (*d*) tuberculous glands. According to the Registrar-General's statistical reviews deaths from these forms of tuberculosis in 1921 were, respectively, (*a*) 2,147, (*b*) 667, (*c*) 417, (*d*) 123, whereas in 1938 the corresponding deaths were (*a*) 595, (*b*) 319, (*c*) 175, (*d*) 45. This means that from these forms of tuberculosis the death rate per million living fell from 88 in 1921 to 25 in 1938, a reduction of 72%. The fall in the death rate from *all other forms of tuberculosis* during the same period was from 1,037 to 607 per million living, a reduction of 42%.

It is also generally agreed that most cases of (*e*) tuberculosis of the respiratory system and (*f*) tuberculosis of the central nervous system are the result of successful infection from human sources. Deaths from these forms of tuberculosis in 1921 were, respectively, (*e*) 33,505 and (*f*) 3,365, whereas in 1938 the corresponding deaths were (*e*) 21,930 and (*f*) 1,744. This means that from these forms of tuberculosis the death rate per million living fell from 973 in 1921 to 574 in 1938, a reduction of 42%.

These figures prove that the greatest percentage reduction (72% in eighteen years) has been in the mortality from those forms of tuberculosis most associated with infection from milk. In the absence of compulsory pasteurization this implies either: (1) a great reduction in the amount of tuberculous milk sold to the public, or (2) a great increase in human resistance against bovine tuberculosis. It would be interesting to know to what extent pasteurization has been voluntarily adopted throughout England and Wales; and also whether there is any positive correlation between pasteurization and the incidence of those forms of tuberculosis associated with tuberculous milk. —I am, etc.,

London, W.8. HALLIDAY SUTHERLAND.

Refresher Courses for Service M.O.s

SIR,—I have read with interest and entire agreement the very pertinent letter from Fl. Lieut. E. L. Graff (July 3, p. 19). I have been serving in the Navy since early 1941, and for the last year and a half have been in an aircraft-carrier. The whole question of "picking up the threads" of civilian medicine after the war has been in my mind for some time, and I am sure that thousands of G.P.s such as ourselves have been similarly exercised about it. Incidentally I assume that Fl. Lieut. Graff writes from the viewpoint of a general practitioner. Only a few weeks ago in a letter to my partner in London I commented on this very question, and urged him to try and get the matter taken up.

Service medicine, especially connected with flying, has many very interesting aspects, and here I imagine I have a fair amount in common with Fl. Lieut Graff, but this is hardly likely to be of much value to the G.P. who hopes to return to civilian practice after the war, unless it be that he is able to appreciate a little more some of the strains and stresses—not all of them physical—to which mankind is subjected.

It is discouraging but inevitable that any case of illness likely to be prolonged cannot be kept in the sick-bay but has to be sent ashore as soon as convenient. This somewhat literal "clearing the decks for action" probably applies to a fighting ship at sea in wartime even more than to land-based units. Thus so much of one's medical care and treatment depends not upon clinical findings but upon what the ship is likely to do in the immediate future. It is only possible, of course, for a relatively small proportion of medical officers in any of the Services to serve in hospital ships or hospitals, and even this closer contact with medicine and surgery obviously cannot embrace a large number of the things one used to encounter in civilian practice.

This letter is not intended as a complaint, because the situation cannot be avoided, but it is an endorsement of one solution of a very important problem which will present itself as soon as the war is over. I venture to suggest that most of us when finally demobilized will be immediately required for the needs of civilian practice, not least that of relieving hardworking colleagues and partners who have held the fort in our absence. In fairness to all let us do this as efficiently as possible. May it not be said in after-years that the immediate post-war period of world war No. 2 showed a decline in the standard of civilian medical service through lack of a little not too difficult forethought and planning.—I am, etc.,

W. B. MUMFORD, M.R.C.S., L.R.C.P.

Medical Boarding for the Merchant Navy

SIR,—When Dr. S. H. Waddy's letter appeared in your issue of Aug. 21 (p. 248) it was not the intention of the Shipping Federation to make any comment. It was felt that he was no doubt recording his honest opinion, but that thinking people would realize that the sweeping generalizations which he made, apparently as a result of one voyage in a British ship, were hardly likely to present a true picture. If the physical standards were as low as he suggested and so many men had to be paid off immediately before sailing through real or pretended disabilities, hardly a ship would get to sea without extraordinary delay. The Ministry of War Transport and those who are responsible for managing our ships know that this does not occur. Moreover, "physically miserable specimens" could hardly have endured 4 years of strain, always in the front line, with the added trials of voyages to North Russia in mid-winter, days in open boats, and long periods in West African ports. As, however, two further letters have now appeared in your issue of Sept. 11 (p. 340), in one of which the Shipping Federation is specifically mentioned, it seems necessary to make one or two brief comments.

Dr. G. D. Gray says that the Shipping Federation has shirked its responsibilities in the matter of medical organization. What seems to be forgotten so often is that the Merchant Navy is an industry and its members are civilians. So far as I am aware no civilians can be compelled to undergo any special form of treatment, or remain in a particular hospital for observation, or submit to vaccination and inoculation. Dr. Gray goes on to say that men suffering from such disabilities as fits, diabetes, tuberculosis of the lung, hernia, duodenal ulcer, and venereal disease can put to sea as easily as Grade I men. This statement cannot be accepted for one moment. The medical officers appointed to examine seamen before each voyage are responsible and qualified men, and further comment seems unnecessary.

Although Dr. Alec Wingfield opens up a wide subject in his very reasonable letter, there is only one statement which should be corrected at once. He suggests that it is within the arbitrary power of one Federation medical officer to deprive a man for ever of his livelihood. Even in peacetime the fact that a man was turned down by a Federation medical officer before a particular voyage did not debar him from the sea for ever. In wartime, now that there is an Essential Work Order covering seamen, a man who is declared unfit by a Merchant Navy Reserve Pool medical officer cannot be discharged from the sea service unless the medical opinion is supported by that of a medical referee appointed by the Ministry of War Transport; and even after the medical referee's opinion has been given the seaman has the right of appeal.

The above comments are only intended to correct misstatements, and no attempt is made to deal with all the questions that have been raised. The industry and the Government are fully alive to the problems which must be faced if the health of seamen—as of all industrial workers—is to be maintained and improved, but it is impossible to discuss them fully and impartially through the medium of correspondence columns.—I am, etc.,

H. W. Greany,
Secretary, the Shipping Federation.

Ealing, W.5.

Stilboestrol for Prostatic Enlargement

Sir,—It would indeed be unfortunate if the letter from Dr. McGee in your issue of Sept. 25 (p. 403) were allowed to influence the use of stilboestrol in the treatment of carcinoma of the prostate. We are not aware of any scientific observations on the treatment of benign enlargement of the prostate with oestrogens, but we have had considerable experience of the treatment of carcinoma of the prostate by means of these agents. There exists an extensive literature, mainly from American sources, on the rationale of this treatment. Dr. McGee can find an excellent summary of this in A. Haddow's able article in the symposium of the Faculty of Radiologists (1943, discussion, pp. 16, 31).

We ourselves have observed eight cases of carcinoma of the prostate which have been rendered completely symptom-free by stilboestrol treatment. From private information we are informed that some American cases are still completely controlled after 4 years of treatment. In our experience side-effects are slight, and often entirely absent. Even in their worst form, however, when contrasted with the sufferings associated with carcinoma of the prostate, they pale into insignificance. It would be most regrettable if sufferers from this fatal condition were to be prevented from obtaining the relief that stilboestrol can give on account of Dr. McGee's letter.—We are, etc.,

E. C. Dodds.
Kenneth Walker.

Childhood Infection and Adolescent and Adult Phthisis

Sir,—To quote from Dr. A. N. Robertson's letter (Sept. 18, p. 373)—"that according to the hypothesis in Report V these symptomless adolescents are the very people who eventually will develop manifest disease, and that in the majority of these cases the expected spread of the disease comes sooner or later after a variable interval." This purports to represent Dr. Macpherson's view in Report V of her article in the *Journal* of July 24 (p. 98). Dr. Macpherson has made it clear that the cases referred to are symptomless, but with radiological evidence of active disease. This is clearly stated in paragraph 5 of Report V of her article. I entirely agree with Dr. Macpherson that artificial pneumothorax is the correct form of treatment for these cases. Once it has been decided that the disease is active there is no point in waiting until symptoms develop. I find it difficult to understand those tuberculosis physicians who wait for T.B.-negative cases to become positive cases before attempting artificial pneumothorax. I would suggest to Dr. Macpherson that all artificial pneumothorax cases should be kept under supervision in a sanatorium for six months as a precaution against complications, which are more liable to occur during the first part of the treatment and which can be dealt with effectively in a sanatorium.—I am, etc.,

H. P. Fernandes.

Chesterfield.

Future Health Services

Sir,—It is to be hoped that every member of the profession has read Dr. Anderson's masterly address (*Supplement*, Sept. 4). Not everyone will agree with all the opinions expressed, but few could desire a more level, realistic, and orderly appraisal of the present situation. It is curious how rarely medical men appear to retain the sincere scientific approach apart from their actual dealings with patients. If Dr. Gaskell's estimate is correct (Sept. 11, p. 342), 95% of his colleagues simply refuse to recognize the history, signs, and symptoms of the body politic. Or can he possibly mean that these "non-politico-aquiescents" are contemplating a *coup d'état*? In which case they would do well to ponder the advice given in Dr. Anderson's last paragraph under the heading "100% *v.* 90%."

I agree with Dr. Gaskell that remuneration under the Factory and N.H.I. Acts is very low, but I do not think that "this is a sample of Governmental valuation of our professional services." In my view it represents the valuation we have set upon ourselves by lack of corporate idealism and the debasement of our members to the level of competitive business units. And being "equipped neither psychologically nor occupationally for mass combination and resistance" we can hardly be surprised at the general tone and outcome of our dealings. Yet if it were so minded the profession has the opportunity to establish for itself a position of independence and dignity comparable with that of His Majesty's judges. I cannot agree that a vocation free to direct its united effort in the cause of science and humanity would lack a sufficiency of the right type of entrants if it were easily accessible to the right type of man. It is true that "a different type of person would begin to enter it," and it is not surprising that many present members of the profession consider that it would be unsuited to them. But it does not follow that "the entire status of the profession would infallibly be lowered."

Dr. Gaskell is mistaken in saying that I deprecated delay pending demobilization.—I am, etc.,

J. Shackleton Bailey.

Eye, Suffolk.

British Schools and Austrian Doctors

Sir,—It should be recorded in the history of the Vienna School (discussed in your issue of Aug. 21, p. 240) that after the invasion of Austria by Hitler the British medical schools gave studying facilities to fifty Austrian doctors. To many of them, who were deprived of all means by the Nazis, free study for two years has been granted by the British teaching hospitals. With the permission of the British Government and the aid of the B.M.A. opportunity to qualify under special conditions was given to assistants and students of men whose names are still well known in the medical profession of this country. Böhler, Eiselsberg, Freud, Holzknecht, Marburg, Neumann, Pirquet, Wagner-Tauregg, Wenckebach, Wertheim, and others attracted many British doctors. These and other British medical men, for reasons of humanity and as a protest against Nazi oppression, organized a hospitality in an unprecedented way in the history of medicine. The sympathy for Vienna's music and Austria's mountains might have endorsed their decision.—I am, etc.,

F. Freund.

Royal National Orthopaedic Hospital, Stanmore.

Obituary

Surg. Rear-AdmL. Sir WILLIAM WHEELER

We are indebted to Prof. T. Gillman Moorhead for the following appreciation:

It is not easy to write with detachment concerning one who has been a close and intimate friend for more than forty years. Wheeler entered the Medical School of Trinity College in 1896 along with the present writer and some fifty others. From the outset he took a keen interest and played an important part in many college activities, including the Dublin University Biological Association. Of this association he soon became a member of council, later secretary, and finally, as a comparatively young graduate, was elected president. His presidential address on the occasion of his opening meeting dealt with the novel subject of the plating of fractures, and among the speakers on his platform was Sir William Arbuthnot Lane, who was then approaching the zenith of his surgical fame.

As a student Wheeler sustained a serious accident which at one time looked like proving a calamity. Walking with friends one evening in St. Stephen's Green, the party broke up, some electing to return home. After á moment's hesitation Wheeler decided to join the home-going group, and, turning, ran to join them. The night was very dark and he collided with an iron railing which protected a tree in the pathway. The railing had projecting spikes situated at a dangerous level; one of these penetrated his eye, inflicting a serious wound. Immediate removal of the damaged eye was recommended, but Wheeler naturally hesitated. A few days later, however, signs of irritation in the other eye developed and so immediate enucleation became imperative. On recovery Wheeler was advised to claim compensation from the Board of Works for their negligence; the Dublin Corporation resisted the claim, and litigation followed. Various novel legal points were involved and the case dragged on from court to court. At last the Board, realizing that judgment was likely to be given against them, offered a settlement out of court; this was accepted and Wheeler was free to resume his interrupted studies. He was determined to adopt surgery as his profession and in no way to permit the misfortune he had suffered to handicap or interfere with his work. Shortly afterwards he gained an appointment on the staff of Mercer's Hospital, and so began his brilliant surgical career. Of that career and of his contributions to surgery I do not attempt to write. It was after his graduation that he and I joined together as teachers of surgery and medicine respectively, and the association then begun continued for the rest of his life. Only a few days before his death I received a letter from him telling me of an impending visit to Dublin and of his joy in coming back for a few days to a country that he loved so well. He always felt happy in Dublin. In London, where he had settled some years before the war, he never felt quite at home. He missed the easy *camaraderie* of Irish life, where friends and acquaintances constantly drop in for a casual meal, a chat, or merely to pass the time of day.

As a surgeon and as a man of affairs Wheeler early showed much independence of mind and great courage in stating and defending his opinions. As a companion he was always entertaining; no company was dull which included him as a member. Often gay and light-hearted, he possessed a puckish humour resembling that of George Bernard Shaw, with whom he was proud to claim kinship. With great charm of manner and a vivid personality, he was a good talker and a sympathetic listener. He was no respecter of persons, was unconventional, and, not infrequently, controversial. When occasion demanded he could be serious. On committees he was shrewd and adroit, an excellent chairman, and full of resource. If in private life one consulted him on any matter of difficulty he would always listen patiently, and his advice was almost invariably wise. One felt he had great knowledge of the world, was prudent and far-sighted. As a surgeon, as I knew him, Wheeler was a brilliant operator. A great believer in travel and in seeing personally the work of other surgeons, he early recognized the value of team work. Soon after qualification he paid a visit to Kocher of Berne and renewed his visit for several years. During those visits in the afternoons we had many a pleasant bathe in the river and walks and talks on the terrace. Later he made a point of visiting all the important centres in England: Sir Robert Jones in Liverpool, Moynihan in Leeds, and, in more recent years, Wilkie in Edinburgh and many others. He was an intimate friend of both Willie and Charlie Mayo, and paid several visits to Rochester. He also visited Crile in Cleveland and other American and Canadian centres. Many will remember the speech he made when, as President of the Royal College of Surgeons in Ireland, he entertained the Mayos, who had that day been admitted to the Honorary Fellowship. As a teacher he was most attractive; his classes at Mercer's Hospital were always thronged. Up-to-date and incisive, he did not hesitate to condemn methods and practices of which he did not approve or which he had found faulty. His many communications to surgical journals had the same quality of incisiveness and lucidity of diction, and displayed strongly held opinions.

When on holiday he loved the country though quickly became impatient to return to work. He was a good shot and a keen fisherman. On one occasion he killed six salmon between dinner and bedtime on a summer evening. He looked forward when the war was over to returning to Ireland, where he intended to write his reminiscences; already, indeed, he had collected much material for the purpose. The annals of medical biography will be the poorer for the lack of a volume which would undoubtedly have been an alive and lively record of many and varied experiences.

Surg. Rear-Admi. G. Gordon-Taylor writes:

Sir William Wheeler lived an eager life of unremitting activity. He had practised in two capitals—his own native Dublin and London; he served in two wars; he held high rank in each conflict in a different branch of the Forces; death came to him suddenly when he was one of the Consulting Surgeons to the Royal Navy. He came of a famous surgical stock, for his father, like himself, was President of the Royal College of Surgeons in Ireland, and almost from his own cradle he had been in personal contact with such surgical giants as Butcher and Stokes of Dublin. Wheeler was always immensely proud of the medical and surgical tradition of the Irish capital and of the hospitals where he received his early training and where the major portion of his surgical life was spent. He adhered with staunch devotion to those methods of surgical technique in which he had been schooled or which he had embraced as a postgraduate disciple in clinics in Britain, America, or Europe; he admired Moynihan, worshipped Kocher, and adored Robert Jones. Yet he was no mere *laudator temporis acti*, despite his hero-worship and his rich knowledge of surgical, and especially Irish surgical, history. Though intensely loyal to the Thomas splint, he was not blind to the value of plaster-of-Paris; he was not merely a suprapubic prostatectomist, but also a master of endoscopic resection; the first occasion on which I saw de Martel's intestinal clamp used was in Mercer's Hospital about 1923.

Till the end of his life Wheeler retained that feeling "which impels a teacher to be a contributor and to add to the stores from which he so freely draws." His surgical interests and writings were catholic in their scope. The list of his contributions bewilders by reason of the number and diversity of subject, and the reader is enthralled by the manner of presentation and captivated by the impeccable language in which each communication is couched. Wheeler had a very special interest in the injuries and diseases of bone—indeed, he was president of the Orthopaedic Section of the British Medical Association in 1933, and served for many years on the Medical Advisory Council on Artificial Limbs, Ministry of Pensions. He was an intransigent opponent of all who dared to decry Syme's amputation, and hostile criticism of the operation only made him champion the procedure more ardently.

ALES HRDLICKA, M.D., D.Sc.

Dr. Ales Hrdlicka, the world-famous anthropologist, who died in Washington on Sept. 5 at the age of 74, was Czech by birth. He was born at Humpolec, Bohemia, on March 29, 1869. After studying in his native town he emigrated with his parents in 1882 to New York, where he studied medicine, graduating M.D. in 1892. He then proceeded to Paris, where he graduated in 1894, returning to join the N.Y. State service as research alienist, becoming later an associate in anthropology at the State Pathological Institute. In 1899 he took charge of the section of physical anthropology of the Hyde expedition to Mexico and South-Western United States, financed by the American Museum of Natural History of New York. In 1903 he became associated with the U.S. National Museum in Washington, an association that was to last 39 years, during which he made that museum the greatest in the world. With his more erudite and senior colleague Dr. Franz Boas, who died at the end of 1942, he made the American contribution to anthropology highly respected in Government and scientific circles throughout the world. In 1918 he founded the *American Journal of Physical Anthropology*. His name, already a household word, became linked with the theories that the Amerind is of Asiatic origin, that the original home of *Homo sapiens* was European and not, as usually held, Asiatic, and that Neanderthal man was not a species of *Homo sapiens* but represented a phase in his evolution. Perhaps in no other departments of science than the twin ones of archaeology and anthropology are theories just mere working hypotheses to be discarded whenever newer facts emerge. Hrdlicka's conclusion that Neanderthal blood persisted in late Palaeolithic time as a result of direct evolution of Neanderthal man into *Homo sapiens* is by no means acceptable to other workers. Against

his denial of the Asiatic origin of *Homo sapiens* and his affirmation of his European origin may be mentioned the fact that the Rhodesian and Boskop skulls from Africa, the Wadjak and Solo ones from Java, as well as the Talgai skull from Australia, are Pleistocene specimens at least contemporaneous with, if not ancestral to, the Aurignacian in Europe. He was elected an Hon. Fellow of the Royal Anthropological Institute in 1918, and awarded the Huxley Medal in 1927. A powerful and prolific writer, his loss to science and to medicine, which he never abandoned throughout his life, is a heavy blow.

R. E. G. A.

H. G. BAYNES, M.B., B.Ch.

Dr. H. G. Baynes, who died on Sept. 6, came into the foreground of medical psychology in England as interpreter of the views of C. G. Jung, whose confidential assistant he was at Zurich for three years after the last war, and he organized and took part in Dr. Jung's expedition to East Africa in 1925-6 for purposes of psychological research among the Masai tribes of Mount Elgon, Kenya. The neglect of Jung's views compared with those of Freud and Adler in this country has been partly due to paucity of exponents. After the death of Dr. Constance Long Dr. Baynes was almost alone in the field.

Born at Hampstead on June 26, 1882, Helton Godwin Baynes was educated at Reading, at Trinity College, Cambridge, and at St. Bartholomew's Hospital. At Cambridge he played football for his college and swam for the University, but he became best known as a fine oarsman. A man of exceptional physique, he was in the Cambridge boat which beat Harvard in 1906, and rowed five in the Cambridge crew which beat Oxford in 1907. At Bart's, after qualifying in 1910, he served as house-physician. He was surgeon-in-charge of the Red Crescent Mission to Turkey during the Balkan War of 1911-12, and then worked as a general practitioner at Wisbech for two years; he left that in 1915 to serve in France, Mesopotamia, and Persia with a temporary commission in the R.A.M.C. Before going to Zurich he was for a short time on the resident staff of the Maudsley Hospital, and he returned to England for a year to work as consulting neurologist under the Ministry of Pensions. Thenceforward Godwin Baynes devoted himself to analytical psychology, and published many papers and books on this and kindred subjects. He was the translator and editor of Jung's *Psychological Types* and two other of Jung's works. An early indication of his bent had been given in Baynes's Cambridge M.B. thesis (1912) on "Fear as the Principal Causative Factor in Hysteria." While at Zurich in 1921 he contributed a paper on psycho-analysis and the psychoses to the *Journal of Mental Science*, and three years later wrote on primitive mentality and the unconscious for the *British Journal of Medical Psychology*. In 1939 he published a book *Mythology of the Soul*, being a research into the unconscious from schizophrenic dreams and drawings, in which he elaborated a technique for exploring the unconscious, and gave a full-length study of the schizophrenic make-up. It was reviewed at some length in these columns by Sir Walter Langdon-Brown on May 18, 1940. Baynes's last published book was *Germany Possessed* (1941).

Dr. Martin Hallam died at his home, Leas Lodge, Yalding, Kent, on Aug. 18. He came of a medical family, and was educated at Repton School, the London Hospital, and Sheffield University. After qualifying M.R.C.S., L.R.C.P. in 1909 he held resident posts at the Royal Hants Hospital, Leicester Royal Infirmary, Wolverhampton General Hospital, and the Jessop Hospital, Sheffield. He served in the R.A.M.C. 1914-18 and afterwards began practice at Yalding. He had a keen interest in clinical medicine and availed himself of postgraduate instruction whenever opportunity permitted. He was anaesthetist to the Kent County Ophthalmic Hospital for a number of years. His pleasure was country life, and from his early youth he had a never-failing fondness for birds, trees, and flowers. He is survived by his wife, his son—Squadron Leader Ian Hallam, who is a prisoner of war in Germany—and daughter. Dr. Hallam kept the Maidstone Division going for a long time and worked hard for the B.M.A. In the words of an old colleague, "he was a very good man."

Lt.-Col. Felix Smith, R.A.M.C. writes: Many hundreds of doctors in the R.A.M.C. who have done a tour of duty in West Africa came to know Dr. E. C. Smith, and will learn of his death with great sorrow. Those of us who disembarked at Lagos received from him a short course of instruction which converted us all into enthusiasts for the subject of tropical diseases, so great were his knowledge and his gift for teaching. Even more shall we remember the visits, half professional and half social, to his laboratories at Yaba. For several hours he kept us entranced, passing through the extensive laboratories, libraries, and experimental animal houses. There was no showmanship in Smith's teaching; it was clear, concise, and modest, and one realized that this was a man who not only knew but had to a large extent created his subject. In his charming bungalow, where he would entertain his little group of students, he had created an atmosphere of the very best type of home, and those visits remain in our memories as one of the oases in the course of the war. We in the R.A.M.C. mourn the loss of a man of great intellectual attainments and great gentleness of spirit.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

Many of the professorial chairs in the University have become vacant during the war and the elections to most of them have been held in suspense by the Council of the Senate. In six cases the suspension has been terminated by Grace of the Senate, and among those elected to the vacant chairs are Dr. A. C. Chibnall, F.R.S., to the Sir William Dunn Professorship of Biochemistry; Dr. R. A. Fisher, F.R.S., to the Arthur Balfour Professorship of Genetics; and Dr. David Keilin, F.R.S., to the Quick Professorship of Biology (re-elected).

At a Congregation held on July 31 the following medical degrees were conferred:

M.D.—L. J. Bendit, J. Yudkin, and R. Wylie-Smith.

M.B., B.Chir.—*J. Attenborough, E. H. Back, *R. A. J. Baily, *H. W. Balme, *D. R. Barnes, C. H. Barnett, *R. F. Bates, *D. L. Bridgwater, *R. A. P. Brown, *W. L. Calnan, *D. J. Conway, *R. A. D. Crawford, *J. Davenport, *M. B. Devas, *D. H. Drennan, *R. M. Forrester, *H. A. Fraser, *M. R. Geake, *R. N. R. Grant, *H. C. Gupta, *B. Haigh, *E. H. Hare, *H. Harris, *J. K. Hinds, G. Hildick-Smith, *P. H. Huggill, *P. F. Jones, J. O. Laws, *J. Lister, *J. C. Lloyd, *R. E. Loder, *C. S. McKendric, D. H. Makinson, N. M. Mann, P. G. Mann, *A. S. Mason, *R. G. May, *P. H. Mitchell, *P. A. G. Monro, *T. Norman, *J. E. Oliver, *W. J. L. Pain, *J. McE. Potter, J. R. Robinson, *K. C. Robinnson, *P. H. Rogers, P. H. Schurr, O. L. S. Scott, *E. L. Simons, *P. S. Smith, *I. S. Staddon, *T. R. Steen, *R. V. Stone, *J. D. Trethowan, *L. R. Twentyman, *G. S. Udall, *D. Vérel, *D. B. Beckwith Whitehouse, *E. H. Williams, *O. H. Wolff, *W. D. Wylie.

* By proxy.

During the months of July and August titles of the degrees of M.B., B.Chir. were conferred by diploma on J. Hardy and Mrs. A. B. Wilcock, both of Girton College.

UNIVERSITY OF LEEDS

The inaugural lecture of the Faculty of Medicine will be given by Sir John Graham Kerr, F.R.S., M.P., emeritus professor of zoology in the University of Glasgow, in the Riley-Smith Hall of the University Union, on Wednesday, Oct. 20, at 3.30 p.m. Subject: "Medicine and Education."

The following have been successful at recent examinations:

M.D.—A. J. E. Barlow, D. M. Davies.

Final M.B., Ch.B. (Part II).—Marjorie Aldred, Elizabeth C. Armstrong, H. J. Balsham, Ruth Blackwood, T. P. Burton, H. S. Capcore, Winifred M. Davies, J. Dawson,* Sybil D. Dawson, J. R. Edge,* R. H. Foxton, R. P. Goulden, J. S. Groves, R. Harris, G. Harrison,* M. Hutchinson, A. R. Hyslop, G. I. Isaacs, A. Jervis, J. R. Kirby, Joyce M. Longley, W. Marshall, H. B. Milner, S. N. Nathan,† Marjorie M. Neil,* Dorothy C. Newell, F. M. Parsons,* D. I. Peacock, Eleanor R. Raistrick, J. Ruston, M. Silverman, M. H. C. Stone, D. R. K. Street, Margaret A. Suffern, M. N. Tempest, J. S. Thorburn, D. Weiner,* W. Whitaker,* R. C. Woodcock.†

* With second-class honours. † Distinction in therapeutics.

The following awards have been made: West Riding Panel Doctors' Prize and William Hey Medal—O. Magidson. Edward Ward Memorial Prize in Surgical Anatomy and McGill Prize in Clinical Surgery—G. Harrison. Hardwick Prize in Clinical Medicine—W. Whitaker. Scattergood Prize in Obstetrics and Gynaecology—Divided between D. Weiner and W. Whitaker.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The Moynihan Lecture will be delivered at the College, Lincoln's Inn Fields, W.C., by Air-Cdre. P. C. Livingston, O.B.E., A.F.C., on Visual Problems of Aerial Warfare. Part I—Night: Studies in the Dark-adapted Eye, on Tuesday, Oct. 5, at 4 p.m.; and Part II—Day: The Influence of Flying Conditions upon Vision, on Wednesday, Oct. 6, at 4 p.m. Fellows and members of the College are invited to attend. Students and others who are not Fellows or Members of the College will be admitted on presenting their private visiting cards.

The following lectures by members of the scientific staff of the Imperial Cancer Research Fund will be delivered at the College, at 3.30 p.m., Thursdays, Oct. 7 and 14 respectively. Mr. H. G. Crabtree: Metabolic Disturbances and the Cancer Problem. Prof. W. E. Gye, M.D., F.R.S.: The Problem of Chemotherapy in Cancer. The lectures are open to medical practitioners, scientists, and advanced students.

The Services

The following have been mentioned in recognition of gallant and distinguished services in North Africa: Major-Gen. (acting) E. M. Cowell, C.B., C.B.E., D.S.O., T.D., late R.A.M.C.; Col. W. D. Arthur, M.B.E., late R.A.M.C.; Cols. (temp.) J. R. N. Warburton, M.C., and T. Young, R.A.M.C.; Major (temp. Lieut.-Col.) J. C. Barnetson, R.A.M.C.; Capts. (temp. Majors) E. G. Houghton and W. Ironside, R.A.M.C.; Capt. (acting Major) J. W. Totten and Capts. D. Collins, E. O. Low, and M. Young, R.A.M.C.

The following appointments, awards, and mentions have been announced in a *Supplement* to the *London Gazette* in recognition of gallant and distinguished services in North Africa:

O.B.E. (*Military Division*).—Col. (acting) W. E. Underwood, Col. (temp.) C. H. K. Smith, M.C.; Lieut.-Col. (Brevet Col.) G. W. R. Bishop, T.D.; Majors (temp. Lieut.-Cols.) J. H. J. Crosse, P. T. L. Day, A. S. Hollins, R. G. M. Keeling, M. MacEwan, D.F.C., T.D., J. J. O'Connell, and J. Trotter, R.A.M.C.; Capts. (temp. Majors) W. A. Law, H. W. Rodgers, A. R. Clarke, and W. C. Gledhill; Capt. C. J. Cobbe, R.A.M.C.

D.S.O.—Col. (temp.) A. L. Crockford, M.C., T.D., R.A.M.C.

Bar to M.C.—Capt. R. R. Gordon, M.C., R.A.M.C.

M.C.—Capts. G. S. Hodge, G. D. Park, and D. Wright, R.A.M.C.

Mentioned in Dispatches.—Brig. (temp.) E. W. Wade, D.S.O., O.B.E., late R.A.M.C.; Brig. (temp.) H. L. Garson, O.B.E., M.C., T.D.; Cols. (temp.) J. H. Donnelly, T.D., T. B. H. Tabuteau, and M. J. Whelton; Col. (acting) P. F. Palmer; Lieut.-Col. R. Coyte; Majors (temp. Lieut.-Cols.) G. Anderton, A. Angus, T.D., J. J. M. Brown, E. A. Downes, R. W. Fairbrother, J. C. Gilroy, W. Graham, N. G. Hill, M.C., T.D., H. H. Kenshole, F. P. L. Lander, F. R. Langmaid, J. D. P. Macpherson, W. R. Martine, M.B.E., T.D., J. W. Orr, M.C., A. S. Pern, T.D., J. K. Slater, K. S. Smith, J. G. E. Vachell, D. S. P. Wilson, A. J. Pitkeathley, and R. V. Phillipson; Major H. W. L. Nichols; Capts. (temp. Majors) S. S. Chesser, D. S. Cownie, W. H. Gabb, E. H. C. Harper, B. Holden, J. R. Kingdon, W. R. Merrington, L. O. Mountford, W. L. Ogle, C. L. Owen, I. B. Pirie, and E. C. Zorab; Capts. T. P. Blanshard, J. Braham, J. G. Cassidy, J. P. M. Donnelly, C. D. Farris, C. C. Fenwick, R. A. Hooper, N. A. Jevons, D. G. Liversedge, H. M. MacFie, M.C., J. McKerrigan, J. M. McKiddie, M. D. Milne, O. D. Morris, D. F. O'Neill, A. Paterson, A. Percival, W. R. Perry, L. J. Samuels, D. G. Sheffield, A. W. Sloan, M. G. Sutton, E. R. Winkleman, and A. B. White, R.A.M.C.; Lieuts. W. H. G. M. Ling, C. W. Richards, and T. Williamson, M.C., R.A.M.C.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* the rising trend of scarlet fever and diphtheria continued, with increases of 226 and 75 respectively. Notifications of whooping-cough were down by 177, of measles by 158, and of dysentery by 37.

The higher incidence of scarlet fever was general throughout the country: in Yorks West Riding notifications were up by 45. A small upward trend in diphtheria has occurred for four consecutive weeks, and the disease is at the highest level since May.

Notifications of dysentery still continue to be high, although there are 37 fewer cases than in the preceding week. The most important of the new outbreaks was in Bedfordshire 29 (Bedford M.B. 21, Luton M.B. 8). Other centres of infection were Kent 29 (Rochester M.B. 20); Hertfordshire 23 (Watford M.B. 20); Buckinghamshire 21 (Wycombe R.D. 12, Aylesbury R.D. 9). The three counties of Leicestershire, Gloucestershire, and Yorks West Riding had 18 cases, compared with a total of 99 in the preceding week.

In *Scotland* there was an outbreak of measles, 58 cases, in Lanark County. Dysentery fell by 24, but was still at a high level, the decrease being due to the North-Eastern area, where the cases dropped from 53 to 18. The largest returns were in Dunbarton County 39, and in Glasgow 15. In the House of Commons on Sept. 21 Mr. Westwood told Mr. McNeil that from Jan. 1 to Sept. 11, 1943, 5,245 cases of pulmonary tuberculosis and 2,204 of non-pulmonary tuberculosis were notified in Scotland.

In *Eire* the returns of infant diarrhoea and enteritis were affected by the inclusion of 46 cases which occurred in a Dublin hospital during the preceding month.

The Week Ending September 18

The returns of infectious diseases in England and Wales during the week included: scarlet fever 2,639, whooping-cough 1,531, diphtheria 723, measles 491, acute pneumonia 365, cerebrospinal fever 44, dysentery 268, paratyphoid 8, typhoid 7.

No. 36

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Sept. 11.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1943 (a)	(b)	(c)	(d)	(e)	1942 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	33	3	19	—	—	62	4	21	—	2
Deaths		—	1				1	1		
Diphtheria	700	36	180	72	16	855	39	202	46	18
Deaths	6	1	1	2	1	17	—	2	—	—
Dysentery	201	8	112	—	—	146	13	64	—	3
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	—	—	1	1	—	1	—	1	—	—
Deaths		1	—				1	—		
Erysipelas		—	37	11	1		—	54	8	1
Deaths		—					—	—		
Infective enteritis or diarrhoea under 2 years				153					156	
Deaths	52	6	14	28	8	73	6	12	10	6
Measles	516	41	87	6	4	2,644	221	124	9	25
Deaths	2	—	—	—	—	1	—	3	—	1
Ophthalmia neonatorum	95	2	20	1	—	76	5	6		—
Deaths										
Paratyphoid fever	5	—	1	—	—	7	2	1	1	—
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal*	308	23	7	—	4	319	20	4	3	4
Deaths (from influenza)	6	—	1	—	1	3	—	—	—	—
Pneumonia, primary			150	7				124	12	
Deaths		16		4	4		—		7	5
Polio-encephalitis, acute	3	—				2	—	—		
Deaths		—					—			
Poliomyelitis, acute	9	1	—	3	—	20	—	2	15	1
Deaths		—	—				—	—		
Puerperal fever	—	4	16	—	—	—	1	15	4	—
Deaths		1								
Puerperal pyrexia†	157	14	9	1	1	125	6	14		1
Deaths		—								
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	2,432	235	303	36	75	1,618	83	318	36	47
Deaths	—	—	—	—	—	—	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever	9	1	6	3	4	30	—	1	11	1
Deaths	—	—	—	—	1	1	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,751	123	255	43	19	1,074	99	63	112	4
Deaths	12	—	3	1	—	3	1	—	1	—
Deaths (0–1 year)	305	31	70	52	21	313	32	53	30	17
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	3,628	488	564	177	125	3,403	459	480	161	97
Annual death rate (per 1,000 persons living)			12·7	11·6	‡			10·8	10·7	‡
Live births	5,811	729	817	318	261	5,890	702	809	385	259
Annual rate per 1,000 persons living			16·7	20·9	‡			16·7	25·7	‡
Stillbirths	211	27	28			226	17	37		
Rate per 1,000 total births (including stillborn)			33					44		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes puerperal fever for England and Wales and Eire.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Medical Notes in Parliament

Recruitment and Allocation of Doctors

On Sept. 21 Sir E. GRAHAM-LITTLE asked the Minister of Health what body was now responsible for the allocation of doctors for civilian services and the fighting Services respectively; what was the relationship between the Central Medical War Committee and the British Medical Association; and how far this committee was subordinate to the Shakespeare Committee in respect of the allocation of medical man-power. Mr. BROWN replied that the Medical Personnel (Priority) Committee, of which Sir Geoffrey Shakespeare was chairman, was responsible for advising, within the limits of any direction that might be given to it by the Government, on the number of doctors to be allocated to the civilian and fighting Services and on matters incidental thereto. The Central Medical War Committee was related to the British Medical Association only to the extent that its secretariat and offices were provided by the Association and that about two-thirds of its members were office-holders or nominees of the Association. The Central Medical War Committee, among other functions, advised on the selection of individual doctors for allocation to the various Services, and was not subordinate to the Shakespeare Committee except in the sense that it must conform with the recommendations of the latter committee as adopted by the Government.

Housing and Health

On Sept. 21 Miss HORSBRUGH informed Mr. Craven-Ellis that the Minister of Health was not aware of statistics giving a direct quantitative relation between housing conditions and infectious disease, but crowding must naturally tend to favour the spread of such disease. Increased density of population involved generally both a higher incidence of infectious disease and an earlier average age of attack.

Medical News

To-day, Friday, Oct 1, at 3 p.m., Miss Margery Fry, M.A., will give the inaugural address at the London (Royal Free Hospital) School of Medicine for Women, in the Medical School, 8, Hunter Street, Brunswick Square, W.C.

The opening of the 101st session of the College of the Pharmaceutical Society of Great Britain and the presentation of prizes will take place on Wednesday, Oct. 6, at 3 o'clock, at 17, Bloomsbury Square. The inaugural sessional address will be given by Mr. William Spencer Howells, president of the society.

A Radiotherapy Section meeting of the Faculty of Radiologists will be held at 32, Welbeck Street, W., on Saturday, Oct. 16, at 10 a.m., when there will be a discussion on "The Treatment of Carcinoma of the Lung."

Dr. Ethel Browell, medical officer in charge of a first-aid post, Civil Defence Casualty Service, Sunderland, has been commended for brave conduct in civil defence.

Only a few hospitals have made a second application for films for testing the amount of radiation received by x-ray workers (*Journal*, Nov. 28, 1942, p. 644). The Ministry of Health (Circular 2718A) reminds hospital authorities that these tests should be repeated at intervals of three months where the reports are satisfactory, and earlier in other cases.

Viscount Weir, chairman of the Glasgow engineering firm of G. and J. Weir, Ltd., has marked his jubilee with the firm by giving £10,000 to the fracture clinic of the Victoria Infirmary, Glasgow. Five years ago Lord Weir established the clinic with a gift of £7,000, and his latest contribution is intended to develop and extend the work of a service which has proved of the utmost value.

By an Order made under the Defence Regulations which comes into force on Sept. 20, all nurses and midwives (other than members of the Civil Nursing Reserve) aged 18 to 40 must in future obtain employment through a local office of the Ministry of Labour. Employers will not be able to engage a nurse or midwife except through an appointments office unless she possesses an exemption certificate. These certificates will be issued to hospitals and similar institutions in respect of appointments to grades equivalent to that of a ward sister or above.

The address of the Royal Institute of Public Health and Hygiene is 28, Portland Place, W., and not as stated in the announcement of the series of lectures on national health (Sept. 25, p. 409).

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

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ANY QUESTIONS?

Potassium in Allergy

Q.—*In "Discovery" some time ago it was stated from an American source that chloride of potash is most effective in the treatment of hay-fever. Has any experience of this been recorded in this country?*

A.—The use of potassium salts has been frequently recommended in allergic conditions such as urticaria, asthma, and hay-fever. The theory behind this recommendation is that in many respects the physiological action of potassium is similar to that of adrenaline. In practice it has proved disappointing. Although enthusiastic reports have at times received wide publicity in the public press and radio in America, most of those who have used potassium chloride critically would agree that it is of limited value in allergy; that it produces many side-reactions, some of them extremely uncomfortable; and that it is decidedly less effective than acetyl salicylic acid (in cases not sensitive to aspirin) or ephedrine plus phenobarbitone in the relief of symptoms. No recent experience in this country is available.

Hyperidrotic Axillae

Q.—*How can excessive perspiration in the axillae be checked? The patient concerned is a healthy girl of 24; she perspires tremendously in the axillae—not elsewhere—soaking and ruining her clothing, despite the use of rubber shields, of various proprietary applications for checking perspiration, and despite extremely careful personal hygiene. She is very sensitive about this condition, and now tends to avoid social functions, dances, tennis functions, etc., and is consequently adopting a somewhat "anti-social" attitude. Further suggestions for the treatment of this condition will be much appreciated.*

A.—Hyperidrosis of the axillae is often maintained by a nervous disposition and over-consciousness of the dysfunction, so that a mild sedative such as tinct. belladonnae, ℿx, in a bromide mixture is often of value, combined with reassurance that the condition will improve. Locally, one might try a saturated solution of alum, to which 1% of formalin may be added if the skin tolerates the substance. *X*-ray therapy in doses of 200 *r* (90 kV) may be given thrice at two-weekly intervals. This has a temporary effect which encourages the patient, and combined with other measures is well worth trying.

Examining the Sputum in Pneumonia

Q.—*I was much interested in the report of a meeting of the Section of Medicine of the R.S.M. held on March 23, in which a discussion took place on atypical primary pneumonia. During the last two winters I saw a large number of cases which correspond closely both clinically and on radiological examination with those described at the meeting. Examination of the sputum of many of these patients by direct smear often revealed fairly large numbers of pneumococci, usually together with a small proportion of other organisms such as streptococci. I have never been quite clear as to how much reliance could be placed on the results of sputum examination in determining the cause of a pneumonia, and I should be grateful for information on this point.*

A.—Claims are made from time to time for the diagnostic and prognostic value of the naked-eye appearances or microscopical examination of sputum in pneumonia, but apart from the classical and practically constant association of rusty sputum with lobar pneumonia, it is doubtful if these claims can be substantiated. Certainly little significance can be attached to the finding of Gram-positive diplococci in a stained smear of sputum, since *Str. viridans*, constantly present in the nasopharyngeal cavity, often appears in diplococcal form. The presence of numerous pus cells and oat-shaped diplococci with a negative halo is, however, suggestive of a pneumococcal infection. Demonstration of capsular swelling

(*Neufeld quellung*) after mixing the sputum with antisera of the different pneumococcal types is the only reliable method of indentifying pneumococci by direct microscopical examination, and it is a pity that this technique has never become popular in this country. With it the identification of certain pneumococcal types—for example, I, II, V, and VII—in the sputum of a febrile patient will almost always mean lobar pneumonia. Other pneumococcal types may be present in the throat as saprophytes. Purulent sputum in which there are many small clumps of staphylococci or short, thick Gram-negative bacilli is suggestive of the rare staphylococcal or Friedländer pneumonias, but streptococci in the sputum have no particular significance because the mouth streptococci may occur in short chains.

Renal Calculi

Q.—*Can an oxalate renal calculus be made friable and break up into small fragments by taking large doses of calcium chloride or herbs? To prevent recurrence, what are the items of diet to be avoided? Are tea, chocolate, lettuce, grapes, and eggs contra-indicated? Why is the excretion in urine of calcium oxalate excessive when free HCl is given by mouth, and also when there is an absence of free HCl from the gastric juice? Does vitamin B_1 affect renal calculi?*

A.—An oxalate calculus is very difficult to break up since calcium oxalate is soluble only in relatively strong acid. If the calculus is a mixture of calcium oxalate and phosphate—the commonest form of oxalate stone—it may be possible to attain solution of the phosphate by acid treatment—such as with calcium chloride or acid-producing herbs—although even this is hindered by the presence of the colloidal material which binds the salts together in the stone. If, on the other hand, the calculus is a mixture of oxalate and urate, acid treatment would tend to cause deposition of urate. A rational method of treatment cannot be advised without a knowledge of the composition of the stone.

Items of diet containing considerable amounts of oxalate and which should be avoided are spinach, rhubarb, and strawberries. There are small amounts in cocoa, coffee, tea, and pepper. Lettuce, grapes, and eggs are oxalate-free.

Excessive excretion of oxalate when free HCl is given is due to increased absorption of the calcium oxalate in foods owing to the increased acidity. Alkaline treatment diminishes excretion of oxalate by hindering absorption of calcium oxalate from the food. In the absence of free HCl in the gastric juice, carbohydrate is liable to undergo fermentation, during which oxalic acid is formed. Thus in this condition excessive oxalate might be excreted even on an oxalate-free diet.

There is no evidence that vitamin B_1 affects renal calculi. (Calcium phosphate stones are favoured by a high-calcium low-vitamin-A dietary.)

Diet in Pregnancy

Q.—*In the past various restrictions in the diet of pregnant women were recommended, often enough without much basis in reason. I should be glad to know whether, for the normal pregnant woman, any restrictions of diet are indicated at any stage of pregnancy, and whether, too, supplements of, for example, iron, calcium, and vitamins should be made to the diet, especially in the last two or three months of pregnancy.*

A.—Restrictions of diet are unnecessary in normal pregnancy. During the last trimester of pregnancy nutritional strain is at its greatest. Provided she eats all her rations, varies and properly cooks her food, there is no need for the expectant mother to have supplements except cod-liver oil and orange juice. The present milk and cheese rations should suffice to cover her calcium needs. The administration of iron should be governed by the Hb level.

Distension of Bowel

Q.—*I have two cases that present great difficulty in treatment. Both patients are women and they suffer from enormous distension of the bowel. The distension is not apparent, or at least not marked, in the mornings, but towards night the abdomen presents the appearance of a 7-months pregnancy, with, of course, a highly tympanitic note throughout. Constipation is not present and liq. paraff. produces a loose motion. What is the aetiology of this condition, and what treatment has any really good result? Neither is of a nervous temperament, but are hard at work in munition factories, while their husbands are in the Middle East.*

A.—There appear to be three possible explanations of the cases:

1. Intestinal carbohydrate dyspepsia, in which the colon becomes distended by gas produced by fermentation of starch which has escaped digestion in the small intestine. Clinically this can be recognized by the relief of discomfort and disappearance of distension on passing flatus. The stools contain undigested starch granules and ferment on incubation. Relief follows avoidance of root vegetables and rice.

2. Interference with portal circulation. This is constant in cirrhosis of the liver and intermittent in obstruction caused by partial volvulus, which is often associated with megacolon. Relief follows injection of 1/4 to 1 c.cm. pitressin, which completely evacuates the faeces and gas accumulated in the colon.

3. As the condition is described as intermittent and no mention is made of relief by passage of flatus, it is probably, like pseudocyesis, the result of abnormal descent of the diaphragm and not of intestinal distension. This may appear and disappear suddenly as a result of spasm of the diaphragm, which is generally hysterical in origin. But as in the two cases described the "distension" develops towards night in women who are hard at work all day, it may be the result of relaxation of the abdominal muscles caused by fatigue with consequent ptosis of the diaphragm. In this condition of pseudo-tympanitis *x* rays show no excess of gas in the colon, no excess of flatus is passed, and the base of the thorax is drawn in, in contrast with its expansion in ascites and when excess of gas is present in the colon. Relief follows instruction in diaphragmatic breathing, and in cases associated with fatigue the use of an abdominal support, or, preferably, rest in the recumbent position for half an hour after the midday meal.

Pest of Flies

Q.—*What is the best way to deal with the fly pest?*

A.—Fly sprays are difficult to obtain now because the pyrethrum supplies are all required by the Army. The following poison bait is a good alternative: 40% formalin, 15 parts; sugar, 15 parts; water, 70 parts. A tablespoonful is placed in several saucers every morning, and this will kill large numbers of flies. If the formalin is old, formic acid may be present, which should be neutralized with a pinch of sodium bicarbonate. Measures against adult flies are only palliative. It is essential to find the breeding site and, if possible, deal with that. Manure heaps, refuse, or other sources of decaying organic matter should be inspected for fly maggots. The local health department should be approached for measures to deal with these sites.

Bee Stings Again

Q.—*I was called to a woman aged 42 who had been stung by bees the previous evening—in the scalp, left forearm, and right leg. All three areas were intensely swollen and painful; the patient was suffering from headache, malaise, and nausea. As the condition suggested an urticarial reaction, I injected 7 minims of a 1:1,000 solution of adrenaline subcutaneously. About a minute after the patient complained of faintness and became blanched; this was followed by a violent shivering and by a series of attacks in which the trunk became arched, as in tetanus, and there was bronchial and laryngeal spasm, causing difficulty in respiration. The pulse was full and bounding, and the patient retained consciousness, though she had difficulty in speaking. These attacks occurred at intervals of about five minutes for nearly three-quarters of an hour, then gradually decreased in violence and intensity and finally ceased, leaving the patient exhausted. There was a violent local reaction at the site of injection—a raised white wheal surrounded by a zone of redness. Why should adrenaline have such an unexpectedly violent effect? Can one be forewarned against such occurrences? And what is the best treatment? Is morphine or atropine indicated for relief of the spasm? The patient is a healthy woman at present having a course of weekly injections of oestrogen for relative sterility.*

A.—This patient exhibits simultaneously symptoms resulting from two different causes: (*a*) Those characteristic of the allergic reaction to the bee stings: *local* swelling at the site of the stings; *general* symptoms—(1) mild and prodromal (headache, malaise, nausea); (2) allergic (bronchial and laryngeal spasm, difficulty in respiration, arching trunk—for by throwing the head well back breathing is facilitated). (*b*) Those characteristic of the pharmacological action of adrenaline: faintness, blanching, shivering, exhaustion. These normal pharmacological effects appear sooner and after smaller doses in some people than in others, and seem to be related to the patient's glycogen stores, as adrenaline converts stored glycogen into blood sugar, which is soon burnt up or excreted. Such effects can be mitigated by ensuring a good supply of glucose, and by keeping the patient recumbent. The "violent local reaction" described is probably the usual local blanching effect of adrenaline in an urticarial skin or during a dermographic phase.

Where symptoms appear hours after the bite the treatment is: (*a*) To give a subcutaneous injection of 5 minims of 1 in 1,000 solution of adrenaline, and to leave the needle in position and give a further 2 minims each 5 to 15 minutes until no further general allergic symptoms are apparent, as the duration of the beneficial effect of an injection of adrenaline is very temporary. A 1 in 100 spray of adrenaline by mouth may be soothing if available. (*b*) To give ephedrine hydrochloride 1/2 gr., and repeat in three hours if any allergic symptoms remain. (*c*) To give plenty of glucose to combat unpleasant effects of the adrenaline, to which the addition of alcohol is not necessary whilst the pulse is "full and bounding." (*d*) To keep the patient lying down as long as possible.

The way to administer adrenaline with the least unpleasant effects is to give it in small repeated doses, the patient being recumbent, and an adequate glucose intake assured. Morphine is never indicated, and atropine only if the choking is due to mucous secretion rather than to oedema of the glottis.

Diathermy in Eye Disease

Q.—*Is there any reliable information about the value of medical diathermy in the treatment of diseases of the eye?*

A.—Thermopile observations have shown that hot fomentations raise the local temperature of tissues very slightly, and this rise is confined to the superficial layers. There is no tangible increase of temperature in the anterior or posterior chambers of the eye or in the vitreous. Diathermy overcomes this limitation, and should be ideally effective in all inflammations of the eye. Clinically, diathermy has proved superior to fomentations in acute iritis and iridocyclitis, and possibly also in congestive secondary glaucoma, but the results have not been particularly striking.

Girl with Facial Hair

Q.—*What is the best treatment for a moustache and beard in a young, healthy lady patient of 24 years?*

A.—If there were any better way of removing hair from the face than shaving every man would use it, and there is no doubt it is the best way for women also if they can be persuaded to try it. Inferior alternatives are the removal of the hair by pulling it out with epilating wax. This is extremely painful on the upper lip. It produces a perfectly smooth face for some one to two weeks, but the hair has to be allowed to reach a certain length again before the wax can get a grip on it. Rubbing the face night and morning for a few seconds only with a piece of smooth pumice stone will often keep the hair short after it has been removed from the face in the first instance by shaving. Even without shaving, the regular application of pumice stone will eventually break the hair off and keep the face smooth, provided the growth is not too strong. Other alternatives are the application of depilatories, electrolysis, and diathermy. Depilatories such as are based on the alkaline sulphides keep the face smooth for rather longer than shaving, because they erode the hair for a short distance below the surface, but as they also erode the epidermis comparatively few people can use them on the face. Electrolysis and diathermy are only suitable for a comparatively small number of strong hairs. No form of radiation treatment can be considered safe for the permanent removal of hair from the face. In patients whose only abnormality is excessive hair on the face, endocrine treatment has not so far proved to be of any use.

The A B C of Syphilis

Q.—*A is attending B for syphilis B is engaged to C, a girl of 19. C's mother calls A in to see her daughter, who has a "boil on her privates." A finds that the "boil" is a primary sore. How should A deal with the case, and what should he tell the parents?*

A.—1. A should take steps to see that C is adequately treated without delay by either himself or someone else fully competent to do so. Treatment should extend over a period of at least one year and throughout any pregnancy. A should forbid marriage, or at any rate pregnancy, for at least five years.

2. It is probable that B infected C, but it is not a certainty. A should tell the parents that the girl is suffering from primary syphilis, and inform them what that entails in the way of personal hygiene, treatment, postponement of marriage, etc. He should *not* tell them how she may have contracted it, nor should he, without the permission of the parents, tell her fiancé or anyone else that she is suffering from syphilis. He would be wise to obtain their permission to tell B in order that the necessity for postponement of marriage may be explained. In fact A would do well to arrange a conference of the parents, B, C, and himself in order that all necessary arrangements could be made.

INCOME TAX

Adjustment of Depreciation Allowance

"PHI" has claimed an adjustment of the depreciation allowance for the past two years, the agreed reductions in the tax paid for those years to be set against the tax for 1943-4. The amounts of the increased allowance are respectively £26 and £48, and in each case the inspector of taxes proposes to deduct 1/10th earned income relief. Is that correct?

*** Yes. If the allowances had been claimed and given in the first instance—i.e., by deduction from the gross assessment—the tax payable would have been affected by 9/10ths of the allowance (e.g., £800−£26=£774 less 1/10th would have been assessed), and the same result must be reached if the allowance is given late.

Earnings of Wife—Post-war Credit

E. B. is a married woman and will be assessable for 1943-4 on earnings of £420. She inquires whether the increase in the special personal allowance in respect of wife's earnings—from £45 pre-war to £80—constitutes a set-off from the post-war credit due in respect of earned income relief.

*** No. The post-war credit due on the £420 assessment—assuming that tax is paid at 10s. in the £—will be due on (1/6th−1/10th=) 1/15th of £420—i.e., £28 at 10s.=£14.

LETTERS, NOTES, ETC.

Failure of Nail Growth

Dr. D. A. MACDONALD writes: The following case has been under my observation for some time, the patient being an N.C.O. For the past 9 months there has been failure of growth of all nails of both fingers and toes. The nails start growing, and after they have reached a length of a few millimetres from the nail folds they crack and peel off. The nail beds have become dry, and the finger tips and the skin have become hardened and marked. The nail which attempts to grow is soft and pliable and of no thickness. The condition is rather disabling as the toes and fingers are subject to trauma. The patient has been seen by several specialists and the condition has been diagnosed as: (1) vitamin deficiency—a full course of vitamin therapy was instituted with no effect; (2) a fungous infection of the nails—antiseptic treatment has proved useless. The N.C.O. is in perfect health, teeth in good condition, and there are no signs of alopecia. Advice is sought regarding the aetiology of the condition and a possible treatment.

Sterility and Contraception

Dr. V. P. GONSALVES (Nightingale Lane, S.W.12) in the course of a letter on this and other subjects writes: I wrote a letter to you for information about the alleged connexion between contraception and sterility. You either ignored it or perhaps thought a reference to that subject (Sept. 11, p. 350) an adequate reply to my inquiry. But that is merely a statement that your correspondent was not cognizant of any changes therein. But it does not disprove the existence of the power of conception before and its disappearance after contraceptive measures nor the contrary. It is well known that an organ obstructed repeatedly in the performance of its function loses partly or even completely that power—e.g., amblyopic eye with error of refraction or eyes in ponies kept long underground in mines. What changes are visible in the perceptive faculties? These facts may have weighed with the expert gynaecologists whom I mentioned in my letter when they cautiously stated that contraception may possibly lead to sterility. But your correspondent is very dogmatic and states that he has seen no physical changes and therefore no harm has resulted.

Treatment of Gynaecomastia

Dr. J. C. JONES (London, S.E.25) writes: I have found that the administration of stilboestrol is effective in the few cases that I have treated in general practice; 2 mg. per day seems to be sufficient.

Survival after Wiring an Aneurysm

Mr. G. H. COLT, F.R.C.S., writes: It might be of interest that the late Sir William I. de C. Wheeler held the world's record for the duration of life, with excellent health and working, of a patient after the wiring of an aneurysm. It was a case of abdominal aneurysm and the man lived 17 years 8 months after the operation. The next longest was Sir D'Arcy Power's—a thoracic aneurysm 10½ years, but in poor health.

Medical Books for Prisoners of War

Since the first appeal in these columns in 1941 for medical books for doctors and others who are prisoners of war, the demand has greatly increased. Many works that are asked for are unobtainable through the ordinary channels, and the Educational Books Section of the War Organization of the British Red Cross and the Order of St. John appeals especially for copies of the following:

Armstrong, *Aids to Anatomy and Physiology*. Ashdown, M., *Complete System of Nursing; Complete System of Nursing for Male Nurses; Elementary Practice of Nursing*. Bentley, A. O., and Driver, J. E., *Textbook of Pharmaceutical Chemistry*. Borradaile, *Zoology for Medical Students*. Chamberlain, *Symptoms and Signs in Clinical Medicine*. Copestake, *Theory and Practice of Massage*. Greisheimer, E., *Anatomy and Physiology*. Kimber and Gray, *Anatomy and Physiology*. Knipers, K. D., *Essentials of Chiropody for Students*. Macaulay, E. I., *Textbook for Mental Nurses*. Pearce, E. C., *Anatomy and Physiology for Nurses; Textbook of Orthopaedic Nursing*. Price, *Textbook of Medicine*. Rose and Carless, *Manual of Surgery*. Runting, E. G. V., *Practical Chiropody*. Sears, W. G., *Medicine for Nurses*. Turner, *Disease of Nose, Throat, and Ear*. Watson-Jones, *Fractures and Other Bone and Joint Injuries*.

This appeal needs no emphasis from us, but we would ask doctors to look along their shelves to see if they have any of these volumes that they no longer use, or, indeed, any other suitable medical books. They should be clean, published since 1935, and should not be marked in ink. The address of the Educational Books Section is The New Bodleian, Oxford.

"Morton's Metatarsalgia"

Dr. J. E. J. PALSER (Theydon Bois, Essex) writes: Mr. W. Sayle Creer (*Journal*, July 24, p. 126) says: "It [Morton's metatarsalgia] was first described in 1875 by Prof. D. P. (or T. G.—various books give different initials) Morton." *Gould's Medical Dictionary*, 1941, p. 887, says, "*Morton's disease*—[Thomas George Morton, American surgeon, 1835-1903]. See *M.'s foot . . . Morton's foot*, a painful affection of the metatarsophalangeal joint of the fourth toe; metatarsalgia."